高被引 1-300

第 1 条，共 300 条

标题: Mineralization regularity, scientific issues, prospecting technology and research prospect of Co.Ni deposits in China.

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Web of Science 核心合集中的 "被引频次": 7

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摘要: TherearefourmajortypesofCo.Nideposits,namely,magmatic,lateritic,(meta.)sedimentaryrock.hosted,and hydrothermaltypes.Inthisstudy,weproposedthatmanyoftheseCo.Nidepositsarecompositedepositsthatarecharacterizedwith commonfeaturesofmultipledeposittypesormultiple.metalelementassemblages,andthesedepositsareimportantbridgesthatcanlink differentdeposittypes,metallogenictheory,andmodelsfororeformationandtheirexploration. Withaspectsofmetalelement occurrences,Ni.dominateddepositsmostlyaccompanyCoenrichmentuptoeconomicgrade,whereasCo.dominateddepositsmaynotbe richinNi.ElementalgeochemistryrevealsthatCoandNicommonlycoexistwithinmagmaticsystem,whiletheycouldseparatelyoccur duringhydrothermal,weatheringandsedimentaryprocesses.Hence,thekeyscientificissuerelevanttoCo.Nimineralizationisthe mechanism ofcoexistenceandseparationofCoandNiintheabove.mentionedprocesses. ToconstructacomprehensiveCo.Ni metallogenictheoryrequiresexperimentalpetrology,numericalmodeling,characterizationsofoccurrenceandenrichmentofCoandNi inadditiontostudiesoftypicalandcompositedeposits.Moreover,morestudiesareneededincludingcouplingofCo.Nimineralization andimportantglobalgeologicaleventsingeologictimeframework,petrogenesisandtectonicsettingofvariousmafic.ultramaficmassifs, andeffectsofhydrothermalmodificationsonCosuper.enrichment.MostCo.Niorebodiesandtheirhostrocksarehighlyvariablein occurrenceandhavesimilargeophysicalpropertiesinmanycaseswithnumerousCo.andNi.bearingphases.Thesecallonmultiple prospectingtechniquesformineralexplorationandevaluation,including:(1)geophysicaltechnologyforidentificationandextractionof ore.relatedsignalsundertheinterferenceofthecarbonaceouslayer;(2)highlysensitiveidentificationtechnologyofsmallintrusions andsteeply.inclinedorebodies;(3)matchingcorrelationofmultipleinformationandore.bearingevaluationtechnology.Considering thecharacteristicsofCo.NidepositsinChina,prospectingtechniquesformagmatictypesshouldbefirstlydeveloped,while(meta.)sedimentaryrock.hostedandhydrothermalCo.Nidepositsmayemployexplorationtechnologyofsyn.geneticdepositsormainmineral deposits

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ESI 高被引论文: Y

ESI 热点论文: Y

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第 2 条，共 300 条

标题: Privacy-Preserving Fast Three-Factor Authentication and Key Agreement for IoT-Based E-Health Systems

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来源出版物: IEEE TRANSACTIONS ON SERVICES COMPUTING 卷: 16 期: 2 页: 1324-1333 DOI: 10.1109/TSC.2022.3149940 出版年: MAR-APR 2023

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摘要: Electronic healthcare (e-health) systems have received renewed interest, particularly in the current COVID-19 pandemic (e.g., lockdowns and changes in hospital policies due to the pandemic). However, ensuring security of both data-at-rest and data-in-transit remains challenging to achieve, particularly since data is collected and sent from less insecure devices (e.g., patients' wearable or home devices). While there have been a number of authentication schemes, such as those based on three-factor authentication, to provide authentication and privacy protection, a number of limitations associated with these schemes remain (e.g., (in)security or computationally expensive). In this study, we present a privacy-preserving three-factor authenticated key agreement scheme that is sufficiently lightweight for resource-constrained e-health systems. The proposed scheme enables both mutual authentication and session key negotiation in addition to privacy protection, with minimal computational cost. The security of the proposed scheme is demonstrated in the Real-or-Random model. Experiments using Raspberry Pi show that the proposed scheme achieves reduced computational cost (of up to 89.9% in comparison to three other related schemes).

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ESI 热点论文: Y

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第 3 条，共 300 条

标题: Asymmetric propagation mechanism of hydraulic fracture networks in continental reservoirs

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来源出版物: GEOLOGICAL SOCIETY OF AMERICA BULLETIN 卷: 135 期: 3-4 页: 678-688 DOI: 10.1130/B36358.1 出版年: MAR 1 2023

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被引频次合计: 16

摘要: Hydraulic fracturing technology is relatively mature in North America, but under complex geological conditions, such as those in China, the application of this technology still faces great challenges. At present, techniques for the numerical simulation of hydraulic fracture networks are mainly based on the prediction of the fracture half-height and half-length, which cannot capture the heterogeneity of continental low-permeability sandstone reservoirs in China and the distribution of the asymmetric hydraulic fracture network present in them. Therefore, determining the asymmetric propagation mechanism of hydraulic fracture networks is very important for improving the recovery rates of continental reservoirs. In this paper, taking the Ordos Basin in China as an example, the spatial distribution of the stress field of a heterogeneous continental reservoir is precisely predicted by reservoir mechanical heterogeneity modeling. By using a microseismic monitoring method, the 3-D morphology of the hydraulic fracture network is determined. Through the coupling of multisource data, the frequency distributions of the determined in situ stress magnitudes in different hydraulic fracturing stages are obtained. The propagation direction of the hydraulic fracture network changes under the control of the horizontal stress difference (Delta sigma) and the presence of natural fractures. The smaller Delta sigma is, the greater the deflection of the hydraulic fracture propagation direction. The asymmetric propagation of these fractures is related to the frequency distribution of Delta sigma. As the frequency of Delta sigma approaches a normal distribution, the two wings of the hydraulic fracture network become basically equal in length, and as Delta sigma deviates more from a normal distribution, the difference between the two wings of the hydraulic fracture network increases. These research results will provide new insight for modeling, exploring, and developing continental reservoirs.

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ESI 热点论文: Y

输出日期: 2023-09-04

第 4 条，共 300 条

标题: Continental geological evidence for Solar System chaotic behavior in the Late Cretaceous

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来源出版物: GEOLOGICAL SOCIETY OF AMERICA BULLETIN 卷: 135 期: 3-4 页: 712-724 DOI: 10.1130/B36340.1 出版年: MAR 1 2023

Web of Science 核心合集中的 "被引频次": 8

被引频次合计: 8

摘要: The Earth's geologic record of Milankov-itch cycles closely tracks Solar System solu-tions for the past 50 million years. Prior to 50 million years ago (Ma), however, the solu-tions lose accuracy rapidly due to chaotic behavior of the Solar System. Here we recon-struct a 10.173 million year-long record from 82.358 Ma to 92.531 Ma of Earth's orbital parameters from a continental lacustrine sequence in the Songliao Basin, China, con-strained by four in situ high-resolution radio-isotopic U-Pb ages and magnetic reversal stra-tigraphy. Analysis of thorium and ostracode shell abundance records from the Songliao Basin reveal evidence for two chaotic secular resonance transitions in the orbital motions of Earth and Mars from 85.2 Ma to 91.55 Ma. The evidence validates similar observations in western North American marine stratigra-phy. A unique phasing between the observed orbital eccentricity and obliquity modulations may explain the anoxic events that occurred in both marine and continental environments during this time. Taken together, the conti-nental and marine stratigraphic evidence demonstrates a strong global reach of Late Cretaceous Milankovitch cycles, and provides an important constraint on Solar System cha-oticity and the calculation of accurate orbital solutions prior to 50 Ma.

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输出日期: 2023-09-04

第 5 条，共 300 条

标题: Lithosphere architecture characterized by crust-mantle decoupling controls the formation of orogenic gold deposits

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摘要: Multidisciplinary research reveals steps of orogenic gold deposits, including mantle partial melting, basic magma ponding and ore fluid release at the base of the crust with decoupled formation from mantle, as well as fluid migration in the middle-upper crust.

This study, via combined analysis of geophysical and geochemical data, reveals a lithospheric architecture characterized by crust-mantle decoupling and vertical heat-flow conduits that control orogenic gold mineralization in the Ailaoshan gold belt on the southeastern margin of Tibet. The mantle seismic tomography indicates that the crust-mantle decoupled deformation, defined from previous seismic anisotropy analysis, was formed by upwelling and lateral flow of the asthenosphere, driven by deep subduction of the Indian continent. Our magnetotelluric and seismic images show both a vertical conductor across the Moho and high Vp/Vs anomalies both in the uppermost mantle and lowest crust, suggesting that crust-mantle decoupling promotes ponding of mantle-derived basic melts at the base of the crust via a heat-flow conduit. Noble gas isotope and halogen ratios of gold-related ore minerals indicate a mantle source of ore fluid. A rapid decrease in Cl/F ratios of lamprophyres under conditions of 1.2 GPa and 1050 degrees C suggests that the ore fluid was derived from degassing of the basic melts. Similar lithospheric architecture is recognized in other orogenic gold provinces, implying analogous formational controls.

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输出日期: 2023-09-04

第 6 条，共 300 条

标题: Multi-stage metasomatic Zr mineralization in the world-class Baerzhe rare earth element Nb-Zr-Be deposit, China

作者: Wu, MQ (Wu, Mingqian); Samson, IM (Samson, Iain M.); Qiu, KF (Qiu, Kunfeng); Zhang, DH (Zhang, Dehui)

来源出版物: AMERICAN MINERALOGIST 卷: 108 期: 2 页: 389-405 DOI: 10.2138/am-2022-8336 出版年: FEB 23 2023

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摘要: Magmatic and metasomatic zircon occurs in many alkaline igneous rocks and both are potential economic reservoirs of Zr, and in some places, rare-earth elements. The Baerzhe deposit in China is an example of a system where both types of zircon occur. Previous studies recognized deuteric and variably altered magmatic zircon in a transsolvus miaskitic granite, as well as four types of metasomatic zircon in a transsolvus agpaitic granite. In this study, the relationships among, and origins of, zircon and how these relate to models for rare-metal mineralization are assessed. In situ backscattered electron (BSE) and cathodoluminescence (CL) imaging, Raman spectroscopy (including mapping), and chemistry of zircon from the agpaitic granite were conducted, combined with evaluation of published data on zircon from Baerzhe. Their textural, spectroscopic, and chemical characteristics suggest that the four types of metasomatic zircon in the agpaitic granite were not subjected to metamictization or intense alteration, with trace-element accommodation largely following a xenotime substitution mechanism. The most abundant type of metasomatic zircon in the agpaitic granite occurs in zircon-quartz pseudomorphs and exhibits comparable CL, Raman spectral, and chemical features to rare zircon that has partially replaced elpidite. This confirms that the pseudomorphs formed by complete replacement of elpidite. The pseudomorph zircon occurs in association with snowball quartz that contains inclusions of zircon, aegirine, and albite, and with secondary quartz containing aegirine. This is consistent with their coeval formation during Na metasomatism. The restriction of Na metasomatism to the agpaitic granite indicates that this event and the associated zircon formation resulted from early autometasomatism of the agpaitic phase. REE-and Be-rich zircon that replaced magmatic amphibole crystallized as a result of reaction with a REE-and Be-rich fluid that most likely was responsible for the later REE-Nb-Be mineralization that affected both the miaskitic and agpaitic granites. The miaskitic granite contains deuteric and altered magmatic zircon with different chemical characteristics to the four types of metasomatic zircon in the agpaitic granite. This suggests that secondary Zr mineralization in the miaskitic granite formed from different fluids to those that metasomatized the agpaitic granite and may also have resulted from autometasomatism. This study reveals a complex picture for the formation of zircon at Baerzhe, the character of which can vary significantly, both temporally and spatially. Such variable chemistry of the various types of zircon resulted not only from their different origins (magmatic vs. metasomatic), but also from localized water-rock interaction that involved multiple stages of fluids. Zircon in both the miaskitic and agpaitic phases was mainly the product of autometasomatism that was constrained to their parental granites.

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第 7 条，共 300 条

标题: Nickel in olivine as an exploration indicator for magmatic Ni-Cu sulfide deposits: A data review and re-evaluation

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摘要: Nickel contents of olivine have been widely used as petrogenetic indicators and as fertility indicators for magmatic sulfide potential of mafic-ultramafic intrusions, on the assumption that olivines crystallized from magmas that had equilibrated with sulfide liquid should be relatively depleted in Ni compared with a sulfide-free baseline. This has given rise to a large accumulation of data that is brought together here, along with data on volcanic olivines, to critically evaluate the effectiveness of the approach. We identify multiple sources of variance in Ni content of olivine at a given Fo content, including variability in mantle melt composition due to depth, water content (and possibly source), subsequent fractional crystallization with and without sulfide, recharge and magma mixing, batch equilibration between olivine and sulfide at variable silicate-sulfide ratio (R), and olivine/liquid ratio; and subsequent equilibration during trapped liquid crystallization in orthocumulates. Baselines for Ni in olivine in relation to Fo content are somewhat lower in orogenic belt settings relative to intrusions in continental large igneous provinces (LIPs). This is probably related to differences in initial parent magma compositions, with plume magmas generally forming deeper and at higher temperatures. No clear, universal discrimination is evident in Ni in olivine between ore-bearing, weakly mineralized, and barren intrusions, even when tectonic setting is taken into account. However, sulfide-related signals can be identified at the intrusion scale in many cases. Low-R factor and low-tenor sulfides are associated with low-Ni olivines in several examples, and these cases stand out clearly. Anomalously high-Ni olivines are a feature of some mineralized intrusions, in part due to trapped liquid reaction effects. However, in some cases, this mechanism cannot account for the magnitude of enrichment. In these cases, enrichment may be due to re-entrainment of "primitive" Ni-rich sulfide by a more evolved Fe-rich magma, driving the olivine to become Ni-enriched due to Fe-Ni exchange reaction between sulfide and olivine during transport. An extreme case of this process may account for ultra-Ni enriched olivine at Kevitsa (Finland), but more subtle signals elsewhere could be positive indicators. A lack of clear mineralized/barren distinction in specific groups of related intrusions, e.g., the deposits of NW China or the Kotalahti Belt in Finland, may well be due to "false negatives" where undiscovered mineralization exists in specific intrusions or in their feeder systems, or may also be due to a multiplicity of confounding factors. Wide variability of both Fo and Ni between related intrusions at regional scale may be a useful regional prospectivity indicator, more than an intrusion-scale discriminant, and is certainly informative as a petrogenetic indicator. In general, the use of Ni-olivine as a fertility tool is more likely to generate false negatives than false positives, but both are possible, and the technique should be used as part of a broader weight-of-evidence approach.

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第 8 条，共 300 条

标题: Giant Mesozoic gold ores derived from subducted oceanic slab and overlying sediments

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摘要: Orogenic gold deposits account for more than 30 % of the global gold resources. To understand the genesis of orogenic gold deposits and ultimately target new orogenic gold deposits, it is important to determine the origin of gold. However, there has been a continuing debate surrounding gold source reservoirs. The Jiaodong gold province, comprising ore hosted within Mesozoic granitoids that intruded Archean meta-morphic rocks, together with other gold occurrences in the North China block, collectively constitute the only Mesozoic world-class gold resource in a Precambrian basement. This geological setting, with young deposits in ancient rocks, offers a great opportunity to better determine the gold source because it allows us to fingerprint the isotopically distinct reservoirs. Specifically, it is possible to determine whether the mass-independent isotopic fractionation sulfur (MIF-S)-bearing Archean supracrustal rocks that form the lower crust are a permissive source. We present multiple sulfur isotope (d34S and D33S) measurements of pyrite grains (n = 161) from 18 gold deposits in the six main districts of the Mesozoic Jiaodong gold pro-vince. Gold-associated pyrite grains yield non-MIF-S signatures (D33S = 0 parts per thousand), indicating that Archean metasedimentary rocks are not a source reservoir of sulfur and gold. The isotopically heavy S (average d34S = +9.0 +/- 3.7 parts per thousand, 2SD) demonstrates a sulfur contribution from a subducted oceanic slab and, in par-ticular, its overlying sediments while excluding mantle and magmatic sources. The subduction-related metamorphism released appreciable gold and sulfur from the top of the downgoing slab into aqueous-carbonic fluids that ascended into the upper plate along crustal structures traversing a tectonically thinned crust. Here, we demonstrate that these giant Mesozoic orogenic gold deposits sourced gold and sulfur during subduction-related devolatilization reactions.(c) 2023 Published by Elsevier Ltd.

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第 9 条，共 300 条

标题: Comparative orotomy of the Archean Superior and Phanerozoic Altaid orogenic systems

作者: Kusky, TM (Kusky, Timothy M.); Sengor, AMC (Sengor, A. M. Celal)

来源出版物: NATIONAL SCIENCE REVIEW DOI: 10.1093/nsr/nwac235 提前访问日期: JAN 2023

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摘要: Comparative tectonic analysis of the Archean Superior and Phanerozoic Altaid orogens reveals remarkable similarities pointing to common processes involved in the formation of continental crust over four billion years of Earth history.

We compare and contrast the materials and mechanisms of continental crustal growth in the largest preserved regions of Phanerozoic and Archean juvenile additions to the crust, to test for similarities or differences in the formation of continents through time. We accomplish this through a comparison of map patterns, lithological contents, and structural and metamorphic evolution of the Phanerozoic Altaid orogenic system of Asia, with the Archean Superior Province of the North American Craton, using a method termed comparative orotomy. Both orogenic systems consist of collages of curvilinear belts of eroded arcs, some older continental slivers, and vast tracts of former subduction/accretionary complexes. These contain numerous shreds of portions of the ophiolite suite, slivers of island and continental arcs, and accreted oceanic plateau, all intruded by multiple magmatic suites during or between multiple deformation events, then sliced by large transcurrent fault systems and bent into large oroclinal structures. We make this comparison because the Superior Province is a typical Archean craton that was later, in the Paleoproterozoic, incorporated into the larger North American Craton, and has occupied a central position in several supercontinents (e.g. Kenorland and Nuna, which then formed the core of Columbia, Rodinia, Laurentia and Pangea) during its longevity. Since it is the largest single fragment of Archean continental cratonic lithosphere preserved on Earth, the Superior Province is widely regarded as a testing ground for how Earth's continental crust was formed. Likewise, the Altaids encompass the largest region of crustal growth for the Phanerozoic. Our comparison with the Altaids is needed, as in recent years many myths about how the planet may have responded to higher heat production and flow in the Archean have emerged, because of trends in the science where regional geology is ignored in favor of numerical models, isotopic proxies for assumed models of chemical behavior for crust-forming or tectonic processes, or comparisons with other-worldly bodies that bear little resemblance to our hydrous Earth. Thus, we return to the geological record, and here describe the map patterns, lithological associations, structural patterns and evolution of both the Altaids and Superior Province, showing how comparative tectonics, orotomy, is useful in the absence of meaningful paleomagnetic or biostratigraphic data. We pay particular attention to the style of preservation of disaggregated members of the ophiolite suite (ophirags) and their relationships with other tectonic units, and to the widespread but largely overlooked role of late-stage major transcurrent motions and structural slicing of both Archean and Phanerozoic orogenic systems in defining the present-day architecture of both orogenic systems.

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第 10 条，共 300 条

标题: Assessing the role of economic globalization on energy efficiency: Evidence from a global perspective

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来源出版物: CHINA ECONOMIC REVIEW 卷: 77 文献号: 101897 DOI: 10.1016/j.chieco.2022.101897 提前访问日期: JAN 2023 出版年: FEB 2023

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摘要: There has been concern that economic globalization will increase energy consumption and reduce energy efficiency. A slew of studies investigating this assertion have used trade, foreign invest-ment, or both as indicators of economic globalization, with mixed findings. A number of concerns challenge the empirical literature including measurement issues, infrequent temporal variations in the data, business cycle effects and heterogeneity bias, which affect the causal ability of eco-nomic globalization. This study used global data of 141 countries to assess the effects of economic globalization on energy efficiency. Our identification strategies involved using more refined measures of economic globalization and energy efficiency, addressing infrequent temporal vari-ations as well as business cycle effects and concerns of heterogeneity bias. Largely, economic globalization positively drives energy efficiency, but this effect suffers from upward bias without controls. We note that infrequent temporal variations in the data and business cycle effects and heterogeneity bias drive the result. Concerning the latter, the result has shown that economic globalization improves energy efficiency only in upper-middle and lower-middle income coun-tries and not in high and lower-income countries. Our results raise serious caution about the causal abilities of existing studies. And we discuss the policy implications.

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第 11 条，共 300 条

标题: Vanadate Bio-Detoxification Driven by Pyrrhotite with Secondary Mineral Formation

作者: He, JX (He, Jinxi); Zhang, BG (Zhang, Baogang); Wang, YN (Wang, Ya'nan); Chen, SM (Chen, Siming); Dong, HL (Dong, Hailiang)

来源出版物: ENVIRONMENTAL SCIENCE & TECHNOLOGY DOI: 10.1021/acs.est.2c06184 提前访问日期: JAN 2023

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摘要: Vanadium(V) is a redox-sensitive heavy-metal con-taminant whose environmental mobility is strongly influenced by pyrrhotite, a widely distributed iron sulfide mineral. However, relatively little is known about microbially mediated vanadate [V(V)] reduction characteristics driven by pyrrhotite and concomitant mineral dynamics in this process. This study demonstrated efficient V(V) bioreduction during 210 d of operation, with a lifespan about 10 times longer than abiotic control, especially in a stable period when the V(V) removal efficiency reached 44.1 +/- 13.8%. Pyrrhotite oxidation coupled to V(V) reduction could be achieved by an enriched single autotroph (e.g., Thiobacillus and Thermomonas) independently. Autotrophs (e.g., Sulfurifustis) gained energy from pyrrhotite oxidation to synthesize organic intermediates, which were utilized by the heterotrophic V(V) reducing bacteria such as Anaerolinea, Bacillus, and Pseudomonas to sustain V(V) reduction. V(V) was reduced to insoluble tetravalent V, while pyrrhotite oxidation mainly produced Fe(III) and SO42-. Secondary minerals including mackinawite (FeS) and greigite (Fe3S4) were produced synchronously, resulting from further transformations of Fe(III) and SO42- by sulfate reducing bacteria (e.g., Desulfatiglans) and magnetotactic bacteria (e.g., Nitrospira). This study provides new insights into the biogeochemical behavior of V under pyrrhotite effects and reveals the previously overlooked mineralogical dynamics in V(V) reduction bioprocesses driven by Fe(II)-bearing minerals.

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第 12 条，共 300 条

标题: From SOA to VOA: A Shift in Understanding the Operation and Evolution of Service Ecosystem

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摘要: With the development of ICT (information and communications technology) and service economy, service ecosystem is emerging in a lot of fields, including E-commerce, O2O(Online To Offline) life service, healthcare service, cloud manufacturing, and so on. As a complex socio-technical system, the evolution of service ecosystem is the joint result of the interaction of the three heterogeneous networks, including social network, service network and value network. Under such circumstances, the traditional SOA (Service Oriented Architecture)-based analysis model is powerless. As a result, how to analyze the laws behind the evolution of service ecosystem is still a serious challenge in the field. This paper proposes a value oriented analysis framework (VOA) of service ecosystem, which can use value as a clue to describe the interaction of the three heterogeneous networks. In addition, a computational experiment system is established to verify the effectiveness of the VOA framework, which stimulates the effect of different intervention strategies on service ecosystem. The result shows that our analysis framework can provide new means and ideas for the analysis of service ecosystem.

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第 13 条，共 300 条

标题: A Metal Solar-Cell Phased Array Antenna

作者: Wang, QX (Wang, Qingxuan); Wang, D (Wang, Ding); Cheng, C (Cheng, Chi); He, DB (He, Debiao)

来源出版物: IEEE TRANSACTIONS ON DEPENDABLE AND SECURE COMPUTING 卷: 20 期: 1 页: 193-208 DOI: 10.1109/TDSC.2021.3129512 出版年: JAN 1 2023

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摘要: Smart-card based password authentication has been the most widely used two-factor authentication (2FA) mechanism for security-critical applications (e.g., e-Health, smart grid and e-Commerce) in the past decades, and it is likely to hold its status in the foreseeable future. Hundreds of this type of 2FA schemes have been proposed, yet to our knowledge, most of them are built on the intractability of conventional hard problems (e.g., discrete logarithm problems and integer factoring problems) which are no longer hard in the quantum era. With the recent advancements in quantum computing, the design of secure and efficient smart-card based password authentication schemes against quantum attacks is becoming increasingly urgent. However, it is not as simple as it seems, how to design such a quantum-resistant 2FA scheme is challenging due to the demanding security requirements and the resource-constrained nature of mobile devices. In this work, we take the first step towards this issue by proposing Quantum2FA, a practical quantum-resistant smart-card-based password authentication scheme that employs Alkim et al.'s lattice-based key exchange and Wang-Wang's "fuzzy-verifier + honeywords" technique (IEEE TDSC'18). Particularly, Quantum2FA can thwart the newly revealed key-reuse attack (ACISP'18, CT-RSA'19) against lattice-based key exchange schemes in two aspects: signal leakage attacks and key mismatch attacks. Specifically, it restricts the necessary conditions (i.e., the attacker must be the initiator of the key exchange) for an adversary to analyze the signal; It introduces honeywords to detect the key mismatches between the smart card and the server, and thus smart card loss attack can be thwarted. We formally prove the security of Quantum2FA under the random oracle model and demonstrate its efficiency through experiments on a 32 MHz 8-bit AVR Embedded Processor. Comparison results show that Quantum2FA is not only more secure but also offers better computation efficiency than the state-of-the-art conventional 2FA schemes.

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第 14 条，共 300 条

标题: Reservoir Quality Prediction of Gas-Bearing Carbonate Sediments in the Qadirpur Field: Insights from Advanced Machine Learning Approaches of SOM and Cluster Analysis

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摘要: The detailed reservoir characterization was examined for the Central Indus Basin (CIB), Pakistan, across Qadirpur Field Eocene rock units. Various petrophysical parameters were analyzed with the integration of various cross-plots, complex water saturation, shale volume, effective porosity, total porosity, hydrocarbon saturation, neutron porosity and sonic concepts, gas effects, and lithology. In total, 8-14% of high effective porosity and 45-62% of hydrocarbon saturation are superbly found in the reservoirs of the Eocene. The Sui Upper Limestone is one of the poorest reservoirs among all these reservoirs. However, this reservoir has few intervals of rich hydrocarbons with highly effective porosity values. The shale volume ranges from 30 to 43%. The reservoir is filled with effective and total porosities along with secondary porosities. Fracture-vuggy, chalky, and intracrystalline reservoirs are the main contributors of porosity. The reservoirs produce hydrocarbon without water and gas-emitting carbonates with an irreducible water saturation rate of 38-55%. In order to evaluate lithotypes, including axial changes in reservoir characterization, self-organizing maps, isoparametersetric maps of the petrophysical parameters, and litho-saturation cross-plots were constructed. Estimating the petrophysical parameters of gas wells and understanding reservoir prospects were both feasible with the methods employed in this study, and could be applied in the Central Indus Basin and anywhere else with comparable basins.

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第 15 条，共 300 条

标题: Potential failure patterns of a large landslide complex in the Three Gorges Reservoir area

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来源出版物: BULLETIN OF ENGINEERING GEOLOGY AND THE ENVIRONMENT 卷: 82 期: 1 文献号: 41 DOI: 10.1007/s10064-022-03062-7 出版年: JAN 2023

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摘要: Potential catastrophic re-activations of ancient massive landslides in reservoir areas have posed serious threats to the safety of local people and the ecological environment. Failure mechanisms and subsequent sliding processes of re-activated massive landslide complexes are relatively complicated and remain to be an open issue. In this paper, the potential sliding process of the Huangtupo landslide, one of the largest ancient landslide complexes undergoing multiple stages of motion in the Three Gorges Reservoir area, is numerically investigated by the arbitrary Lagrangian-Eulerian method with an adaptive meshing technique. The shear strengths of the soils in the sliding zone are determined using the strength reduction method along with a series of laboratory experiment tests. Sensitivity analysis is performed to examine the dependence of the sliding masses upon the shear strength, which illuminates the failure modes of the sliding masses under the weakening effect of water flow upon the toes of the landslide. Then, the sliding mechanisms and the influence zones of the landslides are analysed. Results show that the failure of a retrogressive landslide is much more harmful than that of a thrust-type landslide in the multi-stage landslide events and the consequence of a landslide is more severe when the sliding masses share common sliding surfaces. The present study provides a paradigm for the assessment of the consequence of massive landslide complexes from a numerical perspective.

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第 16 条，共 300 条

标题: Fingerprinting the metal source and cycling of the world?s largest antimony deposit in Xikuangshan, China

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摘要: The Xikuangshan antimony (Sb) deposit is the largest Sb deposit in the world; however, the metal source and cycling and a holistic understanding of the deposit genesis remain equivocal. Sulfur isotope signatures offer a means of fingerprinting different sources in a hydrothermal deposit, although one must be careful to rule out subsequent isotope fractionation during fluid ascent, mixing, and ore precipitation. Here, we investigated the sulfur isotope composition of stibnite oc-curring at depth in the Xikuangshan deposit to distinguish the isotopic signals from the source and the superimposed imprint from near-surface-derived sulfur mixing or isoto-pic fractionation. All stibnites from the deep orebodies displayed limited 634S variation from +6.8%o to +8.4%o, despite their widely varying depths. These results provide direct evidence that 634S values measured in deep orebodies are representative of the isoto-pic composition of initial fluids. The most likely factor controlling the variation of the sulfur isotopes in shallow stibnites (+3.5%o to +16.3%o) is a series of hydrothermal pro-cesses, including Rayleigh fractionation dur-ing ore precipitation, fluid boiling induced by pressure release, and/or local input of pyrite from wall rocks via fluid-rock interaction. Accordingly, we conclude that the Neopro-terozoic basement served as the metal source. We propose a holistic genetic model wherein we envisage that Sb and S were leached from the basement rocks, and the ore-bearing fluids ascended along a deep fault and even-tually precipitated beneath the Devonian shale cap. Thus, sulfur isotopic systematics represent a powerful repository for inter-rogating the metal source and cycling in the hydrothermal ore system.

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第 17 条，共 300 条

标题: A Novel Hybrid LMD-ETS-TCN Approach for Predicting Landslide Displacement Based on GPS Time Series Analysis

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来源出版物: REMOTE SENSING 卷: 15 期: 1 文献号: 229 DOI: 10.3390/rs15010229 出版年: JAN 2023

Web of Science 核心合集中的 "被引频次": 4

被引频次合计: 4

摘要: Landslide disasters cause serious property losses and casualties every year. Landslide displacement prediction is fundamental for mitigating landslide disasters. Several approaches have been used to predict landslide displacement, yet a more accurate and reliable displacement prediction still has a poor understanding of landslide early warning systems for landslide mitigation, due to limited data and mutational displacements. To boost the robustness and accuracy of landslide displacement prediction, this paper assembled a new hybrid model containing the local mean decomposition (LMD), innovations state space models for exponential smoothing (ETS), and the temporal convolutional network (TCN). The proposed model, which is based on over 10 years of long-term time series monitoring GPS data, was tested on the selected case-stepwise Baijiabao landslide in the Three Gorges Reservoir area of China (TGRA) was tested by the proposed model. The results presented that the LMD-ETS-TCN model has the best performance in comparison with other benchmark models. Compared with autoregressive integrated moving average (ARIMA), support vector regression (SVR), and long short-term memory neural network (LSTM), the accuracy was noticeably improved by an average of 40.9%, 46.2%, and 22.1%, respectively. The robustness and effectiveness of the presented approach are attested, and it has discernible improvements for landslide displacement prediction.

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第 18 条，共 300 条

标题: K-Means Clustering-Based Kernel Canonical Correlation Analysis for Multimodal Emotion Recognition in Human-Robot Interaction

作者: Chen, LF (Chen, Luefeng); Wang, KL (Wang, Kuanlin); Li, M (Li, Min); Wu, M (Wu, Min); Pedrycz, W (Pedrycz, Witold); Hirota, K (Hirota, Kaoru)

来源出版物: IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS 卷: 70 期: 1 页: 1016-1024 DOI: 10.1109/TIE.2022.3150097 出版年: JAN 2023

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摘要: In this article, K-means clustering-based Kernel canonical correlation analysis algorithm is proposed for multimodal emotion recognition in human-robot interaction (HRI). The multimodal features (gray pixels; time and frequency domain) extracted from facial expression and speech are fused based on Kernel canonical correlation analysis. K-means clustering is used to select features from multiple modalities and reduce dimensionality. The proposed approach can improve the heterogenicity among different modalities and make multiple modalities complementary to promote multimodal emotion recognition. Experiments on two datasets, namely SAVEE and eNTER-FACE'05, are conducted to evaluate the accuracy of the proposed method. The results show that the proposed method produces good recognition rates that are higher than the ones produced by the methods without K-means clustering; more specifically, they are 2.77% higher in SAVEE and 4.7% higher in eNTERFACE'05.

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输出日期: 2023-09-04

第 19 条，共 300 条

标题: Semi-analytical solution for negative skin friction development on deep foundations in coastal reclamation areas

作者: Wu, WB (Wu, Wenbing); Wang, ZQ (Wang, Zongqin); Zhang, YP (Zhang, Yunpeng); El Naggar, MH (El Naggar, M. Hesham); Wu, T (Wu, Tao); Wen, MJ (Wen, Minjie)

来源出版物: INTERNATIONAL JOURNAL OF MECHANICAL SCIENCES 卷: 241 文献号: 107981 DOI: 10.1016/j.ijmecsci.2022.107981 提前访问日期: DEC 2022 出版年: MAR 1 2023

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被引频次合计: 17

摘要: This paper derives a semi-analytical solution to predict the development of negative skin friction, caused by the consolidation of newly filled soil, on piles in the reclamation area. The simulation of the whole consolidation process of the filled soil is realized by coupling the one-dimensional consolidation model before the pile driving with the two-dimensional consolidation model after the pile driving. The negative skin friction generated at the pile shaft during the consolidation is calculated by accounting the pile-soil interactions with the introduction of the load-transfer method. To address the dramatic changes of the pore water pressure at the initial drainage stage in the classic Terzaghi drainage boundary, the continuous drainage boundary is implemented. A semi-analytical solution to the developed model is derived and subsequently validated through the comparisons with the field tests and finite element method (FEM). A comprehensive parametric study is also conducted to demonstrate the effects of the pile installation time, the surcharge load, the consolidation time before or after piling, and the pile head load on the development of negative skin friction. The negative skin friction was found to be vastly different for piles installed immediately after landfilling and those installed close to full consolidation. To optimize construction period while reducing the negative friction on piles, the pile is better to be driven after the time t = 90%TvH2/C-v1 . It is also observed that the surcharge load on the ground could significantly enhance the stiffness and ultimate capacity of the soil, and the workload subjected at the pile head can transfer the "negative" skin friction into the positive shearing resistance.

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第 20 条，共 300 条

标题: China?s urban and rural residential carbon emissions: Past and future scenarios

作者: Wu, S (Wu, Si); Hu, SG (Hu, Shougeng); Frazier, AE (Frazier, Amy E.); Hu, ZN (Hu, Zongnan)

来源出版物: RESOURCES CONSERVATION AND RECYCLING 卷: 190 文献号: 106802 DOI: 10.1016/j.resconrec.2022.106802 提前访问日期: DEC 2022 出版年: MAR 2023

Web of Science 核心合集中的 "被引频次": 7

被引频次合计: 7

摘要: China faces significant challenges to supply its urban-rural development with energy while reducing carbon emissions. Residential consumption, which is the second-most important source of carbon emissions following industry, has gradually been receiving attention. However, there are fewer studies that systematically investigate rural and urban residential emissions separately, and the future of residential emissions is uncertain given changes in the economic and social drivers. We used 20 years of energy consumption data from 30 provinces in China and panel regression models to analyze how urban and rural carbon emissions have changed over time and space. We then simulated three future scenarios of residential carbon emissions based on the framework of Shared Socioeconomic pathways. We conclude that there has been considerable growth in per capita rural emissions, largely due to population increases, especially during the periods 2004-2012 and 2012-2018. Overall emissions have declined though, likely due to an adjustment of energy intensity. Both rural and urban emissions are expected to decline in the future, but there is variation in where and how rural and urban emissions may change under the three development scenarios.

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第 21 条，共 300 条

标题: Environmental laws and ecological restoration projects enhancing ecosystem services in China: A meta-analysis

作者: Liu, T (Liu, Tao); Yu, L (Yu, Le); Chen, X (Chen, Xin); Wu, H (Wu, Hui); Lin, H (Lin, Hui); Li, CX (Li, Chengxiu); Hou, JR (Hou, Jiaru)

来源出版物: JOURNAL OF ENVIRONMENTAL MANAGEMENT 卷: 327 文献号: 116810 DOI: 10.1016/j.jenvman.2022.116810 提前访问日期: DEC 2022 出版年: FEB 1 2023

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被引频次合计: 8

摘要: In recent decades, China has implemented ecological restoration projects (ERPs) to improve biodiversity and ecosystem services (ESs), accordingly, a series of environmental laws were issued to guide ecological restoration. However, quantitative evaluation of the effectiveness of ERPs remains ambiguous. To respond to the UN Decade on Ecosystem Restoration (UNDER), we conducted a meta-analysis of 85 peer-reviewed publications and an interdisciplinary evaluation framework based on China's environmental protection and land administration laws (EPLALs) were established to assess the effectiveness of ERPs. We found that ERPs enhanced ESs by 15-58%. Specifically, ERPs implemented in industrial/mining, and wetland regions significantly increased regulating and cultural services, and in arid and semi-arid regions mainly enhance provisioning services (72.98%). Climate factors were found to be crucial for ecological restoration effectiveness (temperature: r =-0.582, significance <0.05; precipitation: r = 0.635, significance <0.05). China's environmental laws emphasized management and investment in ecological restoration. However, the disclosure, public participation and real-time monitoring of ecological conditions need to be improved urgently. We therefore developed ERP-related policy recommenda-tions and global lessons to help improve the effectiveness of ecological restoration.

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第 22 条，共 300 条

标题: Spatial-temporal characteristics and policy implication for non-grain production of cultivated land in Guanzhong Region

作者: Zhang, DJ (Zhang, Daojun); Yang, WJ (Yang, Wanjing); Kang, DR (Kang, Dingrong); Zhang, H (Zhang, Han)

来源出版物: LAND USE POLICY 卷: 125 文献号: 106466 DOI: 10.1016/j.landusepol.2022.106466 提前访问日期: NOV 2022 出版年: FEB 2023

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摘要: Non-grain production of cultivated land (NGPOCL), as a severe threat to food security, has attracted great attention in China and other countries of the world. Although some scholars have focused on the NGPOCL, few studies performed the analysis at the plot scale across the whole region. This study takes Guanzhong Region as the study area and carries out a comprehensive analysis of NGPOCL according to the framework of "phenome-non-cause-countermeasure". According to the land-use map, the range of cultivated land was delineated; based on the 16-day time resolution MODIS vegetation index data, the NGPOCL range was further extracted from the cultivated land by distinguishing the grain/non-grain crops according to their seasonal variation characteristics on the vegetation index. Some spatial statistical methods were used to analyze the spatial-temporal character-istics of NGPOCL in the study area from 2000 to 2018, and it was observed as follows. Firstly, the NGPOCL problem in Guanzhong Region was getting worse during the study period, and the NGPOCL severity and area increased by 10.79% and 31.30% respectively. Secondly, the NGPOCL process showed significant temporal and spatial heterogeneity. The gravity center for NGPOCL was gradually shifted from Chunhua County to Xi'an City in the southeast. Meanwhile, the spatial autocorrelation of NGPOCL was weakening, and Moran' I was declining year by year. These indicated that the NGPOCL had been fully rolled out in the Guanzhong Region, and it had evolved from the past adjacent expansion to the current full bloom. As for the driving mechanism, while those natural factors determined the skeleton of the NGPOCL pattern, social and economic factors played an important role in the evolution process following, and different industrial policies have dominated the NGPOCL expansion at different stages. In the future, it is necessary to pay attention to the impact of industrial policies on NGPOCL and consider the demands of urbanization for non-grain agricultural products properly, so as to develop the characteristic agricultural products industry in a reasonable and compliant manner.

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第 23 条，共 300 条

标题: Impact of urbanization on ecosystem health in Chinese urban agglomerations

作者: Chen, WX (Chen, Wanxu); Wang, GZ (Wang, Guanzheng); Zeng, J (Zeng, Jie)

来源出版物: ENVIRONMENTAL IMPACT ASSESSMENT REVIEW 卷: 98 文献号: 106964 DOI: 10.1016/j.eiar.2022.106964 提前访问日期: OCT 2022 出版年: JAN 2023

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摘要: With rapid economic growth, urbanization has interfered with regional ecosystems and seriously threatens ecosystem health (EH) in urban agglomerations (UAs) in China. Exploring the impact of urbanization on the EH of UAs in China can provide insights into formulating new policies regarding EH protection and high-quality development. However, investigations on this issue are primarily concentrated on single UAs, and only a few have been conducted on all UAs in China. Therefore, this study measured the urbanization and EH of 19 UAs in China in 2000, 2010, and 2020, and explored the impact of urbanization on EH using Getis-Ord Gi\* and mul-tiscale spatial regression models. The results indicated that EH presented a moderate growth trend, with mean values of EH increasing from 0.72 to 0.73 during the study period. The EH of UAs in northern China was significantly lower than that in southern China. Global Moran's I values of EH changes between 2000 and 2010 and between 2010 and 2020 were 0.511 and 0.283, respectively; the Z-scores were 47.308 and 26.377, respectively (p = 0.001), thus indicating that EH changes in China's UAs had strong spatial concentrations. Moreover, cold spots of EH changes primarily appeared in UAs in southeast China, whereas hot spots were mostly distributed in northwest China. Furthermore, on a global scale, the proportion of construction land and popu-lation density had a negative impact on EH, and the regression coefficients in 2020 were-0.637 and-0.276, respectively; GDP density had a positive effect, and its regression coefficient in 2020 was 0.051. However, the impact of urbanization on EH greatly varied at the local scale. These results provide a scientific reference basis to coordinate construction land expansion, economy, population, and EH, and provide support for the formulation of high-quality development policies for UAs in China.

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第 24 条，共 300 条

标题: Centrifuge modelling of landslides and landslide hazard mitigation: A review

作者: Fang, K (Fang, Kun); Tang, HM (Tang, Huiming); Li, CD (Li, Changdong); Su, XX (Su, Xuexue); An, PJ (An, Pengju); Sun, SX (Sun, Sixuan)

来源出版物: GEOSCIENCE FRONTIERS 卷: 14 期: 1 文献号: 101493 DOI: 10.1016/j.gsf.2022.101493 提前访问日期: OCT 2022 出版年: JAN 2023

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摘要: Landslides are serious geohazards that occur under a variety of climatic conditions and can cause many casualties and significant economic losses. Centrifuge modelling, as a representative type of physical modelling, provides a realistic simulation of the stress level in a small-scale model and has been applied over the last 50 years to develop a better understanding of landslides. With recent developments in this technology, the application of centrifuge modelling in landslide science has significantly increased. Here, we present an overview of physical models that can capture landslide processes during centrifuge mod-elling. This review focuses on (i) the experimental principles and considerations, (ii) landslide models subjected to various triggering factors, including centrifugal acceleration, rainfall, earthquakes, water level changes, thawing permafrost, excavation, external loading and miscellaneous conditions, and (iii) different methods for mitigating landslides modelled in centrifuge, such as the application of nails, piles, geotextiles, vegetation, etc. The behaviors of all the centrifuge models are discussed, with emphasis on the deformation and failure mechanisms and experimental techniques. Based on this review, we provide a best-practice methodology for preparing a centrifuge landslide test and propose further efforts in terms of the seven aspects of model materials, testing design and equipment, measurement methods, scaling laws, full-scale test applications, landslide early warning, and 3D modelling to better understand the complex behaviour of landslides.(c) 2022 China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/ licenses/by-nc-nd/4.0/).

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第 25 条，共 300 条

标题: Grid structure phase change composites with effective solar/electro-thermal conversion for multi-functional thermal application

作者: Lin, FK (Lin, Fankai); Liu, XJ (Liu, Xianjie); Leng, GQ (Leng, Guoqin); Bai, YN (Bai, Yaning); Feng, J (Feng, Jian); Guo, ZJ (Guo, Zijiao); Wang, ZK (Wang, Zekun); Huang, ZH (Huang, Zhaohui); Mi, RY (Mi, Ruiyu); Min, X (Min, Xin); Hu, XZ (Hu, Xiaozhi)

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摘要: Phase change materials (PCMs) have high energy storage density and stable phase transition temperature, and are one of the most promising thermal storage and management materials. However, the PCMs' shape instability, poor light absorption, low electrical and thermal conductivity seriously hinder their multi-functional application. Herein, a three-dimensional carbon aerogel with grid structure, large porosity, and hierarchical porous structure was prepared from resource-rich plant straw for supporting PCMs. Polyethylene glycol (PEG) as thermal energy guest was encapsulated into carbon aerogel by simple vacuum impregnation. The obtained PEG/carbon aerogel composites show high loading rate of PCMs(>97%), high thermal storage density (>185 J g-1), stable shape, and effective solar/electro-thermal conversion. The grid structure carbon aerogel as efficient thermal and elec-tron transfer pathways guarantee effective solar/electro-thermal conversion of composites. PEG encapsulated in each lattice as a thermal functional unit realizes the thermal storage and management. Especially, grid-structure composites realized fast and uniform electro-thermal conversion and storage under low voltage. This work provides a feasible, economic, and large-scale preparation strategy for the multi-functional PCMs. The multi-functional composites have broad application prospects in solar energy capture and storage, waste power recycling, building energy saving, smart thermal management and so on.

入藏号: WOS:000875662100006

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第 26 条，共 300 条

标题: Challenges of Z-scheme photocatalytic mechanisms

作者: Wang, LX (Wang, Linxi); Bie, CB (Bie, Chuanbiao); Yu, JG (Yu, Jiaguo)

来源出版物: TRENDS IN CHEMISTRY 卷: 4 期: 11 页: 973-983 DOI: 10.1016/j.trechm.2022.08.008 提前访问日期: OCT 2022 出版年: NOV 2022

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摘要: Z-scheme photocatalytic systems have been extensively studied since they are supposed to promote carrier separation while boosting redox abilities. Herein, we analyze the challenges of photocatalytic mechanisms in liquid-phase and all-solid-state Z-scheme systems from various perspectives, including thermody-namics, charge-transfer dynamics, applicability, and practical synthesis. Notably, in this opinion, we analyze the challenges for electron transfer in liquid-phase Z-scheme systems, where photocatalyst nanoparticles (NPs) and redox couples are constantly under dynamic motion and the transfer of free electrons via water media is prohibited. These problems ultimately led to the flourishing of step-scheme (S-scheme) heterojunctions.

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第 27 条，共 300 条

标题: Nitrate dynamics and source identification of rainwater in Beijing during rainy season: Insight from dual isotopes and Bayesian model

作者: Zeng, J (Zeng, Jie); Han, GL (Han, Guilin); Zhang, ST (Zhang, Shitong); Qu, R (Qu, Rui)

来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 856 文献号: 159234 DOI: 10.1016/j.scitotenv.2022.159234 提前访问日期: OCT 2022 子辑: 2 出版年: JAN 15 2023

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摘要: Anthropogenic reactive nitrogen emissions have a significant impact on atmospheric chemical composition and earth surface ecosystem. As one of the most important sinks of atmospheric nitrogen, the wet deposition of nitrate (rainwater NO3-) has been widely concerned. Yet, the sources and transformation processes of wet deposited NO3- were not well revealed in megacity during rainy season in the context of global climate change. Here, we investigated the concentrations of nitrogen components and dual isotopes of rainwater nitrate collected in Beijing during July to August 2021 (rainy season). The main findings showed that the concentrations of NH4+-N, NO3--N, and NO2--N ranged 0.5- 6.7 mg L-1, 0.3- 4.5 mg L-1, and 0.05- 0.18 mg L-1, respectively, with the average relative percentages of 69 %, 29 %, and 2 %. The stoichiometry analysis of characteristic ion ratios indicated that the contribution of municipal wastes and agricultural sources to rainwater NH4+-N is relatively significant, while traffics were the major contributor of NO3--N instead of the fixed emission. Rainwater delta 15N-NO3- and delta 18O-NO3- presented slightly 15N-depleted characteristic compared to previous studies with the average values of -3.9 +/- 3.1 parts per thousand and 58.7 +/- 12.6 parts per thousand. These isotope compositions suggesting an origin of rainwater NO3- from the mixing of multi-sources and was mainly generated via the pathway of OH radical oxidization. Further source apportionment of rainwater NO3- by Bayesian mixing model evaluated that traffic (30.3 %) and soil (30.3 %) emissions contributed mostly to NO3-, while the contribution of biomass burning (18.8 %) and coal combustion (20.6 %) were relatively lower. This study highlighted the important role of dual isotopes in rainwater nitrate source identification and formation processes in megacity.

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第 28 条，共 300 条

标题: A size-adaptive strategy to characterize spatially heterogeneous neighborhood effects in cellular automata simulation of urban growth

作者: Zhang, B (Zhang, Bin); Hu, SG (Hu, Shougeng); Wang, HJ (Wang, Haijun); Zeng, HR (Zeng, Haoran)

来源出版物: LANDSCAPE AND URBAN PLANNING 卷: 229 文献号: 104604 DOI: 10.1016/j.landurbplan.2022.104604 提前访问日期: OCT 2022 出版年: JAN 2023

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摘要: As an important component of the cellular automata (CA) model, the neighborhood defines the geographical interaction domain (GID) of cells and their interaction mechanisms. However, the invocation of "spatial neighborhood stationarity" leads to the CA neighborhood being spatially homogeneous, which apparently vio-lates the spatial heterogeneity of geographical dynamics. This study proposes a size-adaptive strategy for the definition of the CA neighborhood, which makes its size vary with the cell location. The CA model with size -adaptive neighborhood (SAN) has been constructed by coupling a defined size sequence with the distribution of cell GID approximated by the local accessibility distribution. Taking the urban growth of Wuhan from 2000 to 2020 as an example, the CA models with original neighborhood (ORN), dual-scale neighborhood (DSN), and SAN have been compared to investigate the performance of the SAN. The results show that the SAN is superior to the ORN and DSN in the characterization of the local interactions of urban growth, and the SAN-CA model can produce a more regular urban landscape and more accurate simulation results. Besides, the applicability of serial and parallel algorithms to the size-adaptive strategy has been detected by comparing their computational effi-ciency. Although the serial algorithm is easier to perform the size-adaptive strategy, the high computational efficiency of the parallel algorithm makes it more suitable for calculating the SAN effect. This study contributes to superseding the hypothesis of "spatial neighborhood stationarity" and improving the ability of CA models to simulate urban growth with spatial heterogeneity.

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输出日期: 2023-09-04

第 29 条，共 300 条

标题: Aligned channel Gelatin@nanoGraphite aerogel supported form-stable phase change materials for solar-thermal energy conversion and storage

作者: Feng, J (Feng, Jian); Liu, XJ (Liu, Xianjie); Lin, FK (Lin, Fankai); Duan, SZ (Duan, Shengzhi); Zeng, KQ (Zeng, Keqing); Bai, YN (Bai, Yaning); Wu, XW (Wu, Xiaowen); Huang, ZH (Huang, Zhaohui); Min, X (Min, Xin)

来源出版物: CARBON 卷: 201 页: 756-764 DOI: 10.1016/j.carbon.2022.09.064 提前访问日期: OCT 2022 出版年: JAN 5 2023

Web of Science 核心合集中的 "被引频次": 12

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摘要: To overcome the poor shape stability, low thermal conductivity, and weak photo response of phase change materials (PCMs), we designed a kind of Gelatin@nanoGraphite aerogel with aligned channel structure of graphite nanosheets and a new type of stable Paraffin/Gelatin@nanoGraphite composite PCMs was fabricated in this work. The graphite nanosheets were used as thermal conduction and photon absorption fillers. The microstructure, thermal conductivity, thermal stability, and solar-thermal conversion of the composite PCMs have been investigated. The results show that the rich porosity of the prepared Gelatin@nanoGraphite aerogel effectively loads a large amount of paraffin wax (>93.2 wt%). Meanwhile, the composite PCMs had anisotropic solar-thermal conversion and thermal conductivity (radial 3.75 and axial 2.59 W/(m.K)), high melting enthalpy (>146.4 J/g), and excellent phase change cycle and shape stability. This material has intensive application prospects in the fields of building energy saving, human body hyperthermia and solar energy collection system.

入藏号: WOS:000868911500006

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第 30 条，共 300 条

标题: Effects of digital economy on carbon emission reduction: New evidence from China

作者: Yi, M (Yi, Ming); Liu, YF (Liu, Yafen); Sheng, MS (Sheng, Mingyue Selena); Wen, L (Wen, Le)

来源出版物: ENERGY POLICY 卷: 171 文献号: 113271 DOI: 10.1016/j.enpol.2022.113271 提前访问日期: OCT 2022 出版年: DEC 2022

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摘要: Recently, the progress of reaching carbon emission peaks and achieving carbon neutrality has had significant impacts on the global economy. The overall societal efforts on carbon emission reduction from various industries will likely be strengthened, thanks to the advantages enterprises could gain in digital technologies through a structural upgrade in the energy systems. Based on China's provincial panel data from 2011 to 2019, this paper constructs a spatial panel Durbin model and a mediating effect model to investigate the mechanism and influence of the digital economy on carbon emission reduction. The results show that (1) the development of the digital economy has a significant spatial spillover effect on carbon emission reduction; (2) the digital economy in-fluences carbon emission reduction both directly and indirectly. This means that the carbon emission reduction can be affected indirectly by the digital economy through the transformation of energy structure; (3) the carbon emission reduction effect of the digital economy exhibits regional heterogeneity, it is more prominent in eastern regions than in other areas. The above findings provide substantial empirical evidence to policymakers on how to best promote the development of the digital economy and intensify the coordination of China's digital infra-structure in regional environmental governance.

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第 31 条，共 300 条

标题: Cross-View Locality Preserved Diversity and Consensus Learning for Multi-View Unsupervised Feature Selection

作者: Tang, C (Tang, Chang); Zheng, X (Zheng, Xiao); Liu, XW (Liu, Xinwang); Zhang, W (Zhang, Wei); Zhang, J (Zhang, Jing); Xiong, J (Xiong, Jian); Wang, LZ (Wang, Lizhe)

来源出版物: IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 卷: 34 期: 10 页: 4705-4716 DOI: 10.1109/TKDE.2020.3048678 出版年: OCT 1 2022

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摘要: Although demonstrating great success, previous multi-view unsupervised feature selection (MV-UFS) methods often construct a view-specific similarity graph and characterize the local structure of data within each single view. In such a way, the cross-view information could be ignored. In addition, they usually assume that different feature views are projected from a latent feature space while the diversity of different views cannot be fully captured. In this work, we resent a MV-UFS model via cross-view local structure preserved diversity and consensus learning, referred to as CvLP-DCL briefly. In order to exploit both the shared and distinguishing information across different views, we project each view into a label space, which consists of a consensus part and a view-specific part. Therefore, we regularize the fact that different views represent same samples. Meanwhile, a cross-view similarity graph learning term with matrix-induced regularization is embedded to preserve the local structure of data in the label space. By imposing the l(2)(,1)-norm on the feature projection matrices for constraining row sparsity, discriminative features can be selected from different views. An efficient algorithm is designed to solve the resultant optimization problem and extensive experiments on six publicly datasets are conducted to validate the effectiveness of the proposed CvLP-DCL.

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第 32 条，共 300 条

标题: City-level emission peak and drivers in China

作者: Shan, YL (Shan, Yuli); Guan, YR (Guan, Yuru); Hang, Y (Hang, Ye); Zheng, HR (Zheng, Heran); Li, YX (Li, Yanxian); Guan, DB (Guan, Dabo); Li, JS (Li, Jiashuo); Zhou, Y (Zhou, Ya); Li, L (Li, Li); Hubacek, K (Hubacek, Klaus)

来源出版物: SCIENCE BULLETIN 卷: 67 期: 18 页: 1910-1920 DOI: 10.1016/j.scib.2022.08.024 提前访问日期: SEP 2022 出版年: SEP 30 2022

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摘要: China is playing an increasing role in global climate change mitigation, and local authorities need more city-specific information on the emissions trends and patterns when designing low-carbon policies. This study provides the most comprehensive CO2 emission inventories of 287 Chinese cities from 2001 to 2019. The emission inventories are compiled for 47 economic sectors and include energy-related emissions for 17 types of fossil fuels and process-related emissions from cement production. We further investigate the state of the emission peak in each city and reveal hidden driving forces. The results show that 38 cities have proactively peaked their emissions for at least five years and another 21 cities also have emission decline, but passively. The 38 proactively peaked cities achieved emission decline mainly by efficiency improvements and structural changes in energy use, while the 21 passively emission declined cities reduced emissions at the cost of economic recession or population loss. We propose that those passively emission declined cities need to face up to the reasons that caused the emission to decline, and fully exploit the opportunities provided by industrial innovation and green investment brought by low-carbon targets to achieve economic recovery and carbon mitigation goals. Proactively peaked cities need to seek strategies to maintain the downward trend in emissions and avoid an emission rebound and thus provide successful models for cities with still growing emissions to achieve an emission peak.(c) 2022 Science China Press. Published by Elsevier B.V. and Science China Press. All rights reserved.

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第 33 条，共 300 条

标题: Orthogonal Charge Transfer by Precise Positioning of Silver Single Atoms and Clusters on Carbon Nitride for Efficient Piezocatalytic Pure Water Splitting

作者: Hu, C (Hu, Cheng); Hu, JC (Hu, Jingcong); Zhu, ZJ (Zhu, Zijian); Lu, Y (Lu, Yue); Chu, SQ (Chu, Shengqi); Ma, TY (Ma, Tianyi); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

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摘要: Developing efficient piezocatalytic systems for two-electron water splitting (TEWS) with producing H-2 and H2O2 shows great promise to meet the industrial demand. Herein, Ag single atoms (SAs) and clusters are co-anchored on carbon nitride (AgSA+C-CN) to serve as the multifunctional sites for efficient TEWS. The Ag SAs enhance the in-plane piezoelectric polarization of CN that is intimately modulated by the atomic coordination induced charge redistribution, and Ag clusters afford strong interfacial electric field to remarkably promote the out-of-plane migration of piezoelectrons from CN. Moreover, AgSA+C-CN yields a larger piezoresistive effect that elevates carrier mobility under strain. Consequently, a superior H-2 and H2O2 evolution rate of 7.90 mmol g(-1) h(-1) and 5.84 mmol g(-1) h(-1) is delivered by AgSA+C-CN, respectively, far exceeding that of the previously reported piezocatalysts. This work not only presents the SAs decoration as an available polarization enhancement strategy, but also sheds light on the superiority of multi-sites engineering in piezocatalysis.

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第 34 条，共 300 条

标题: Soil bacterial community structure in the habitats with different levels of heavy metal pollution at an abandoned polymetallic mine

作者: Yin, Y (Yin, Yue); Wang, XJ (Wang, Xiaojie); Hu, YA (Hu, Yuanan); Li, FD (Li, Fadong); Cheng, HF (Cheng, Hefa)

来源出版物: JOURNAL OF HAZARDOUS MATERIALS 卷: 442 文献号: 130063 DOI: 10.1016/j.jhazmat.2022.130063 提前访问日期: SEP 2022 出版年: JAN 15 2023

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摘要: Heavy metal pollution caused by mining activities can be harmful to soil microbiota, which are highly sensitive to heavy metal stress. This study aimed to investigate the response of soil bacterial communities to varying levels of heavy metal pollution in four types of habitats (i.e., tailing, remediation, natural recovery, and undisturbed areas) at an abandoned polymetallic mine by high-throughput 16 S rRNA gene sequencing, and to determine the dominant ecological processes and major factors driving the variations in bacterial community composition. The diversity and composition of bacterial communities varied significantly between soil habitats (p < 0.05). Heterogeneous selection played a crucial role in shaping the difference of bacterial community composition between distinct soil habitats. Redundancy analysis and Pearson correlation analysis revealed that the total contents of Cu and Zn were key factors causing the difference in bacterial community composition in the tailing and remediation areas, whereas bioavailable Mn and Cd, total nitrogen, available nitrogen, soil organic carbon, vegetation coverage, and plant diversity were key factors shaping the soil bacterial structure in the undisturbed and natural recovery areas. These findings provide insights into the distribution patterns of bacterial communities in soil habitats with different levels of heavy metal pollution, and the dominant ecological processes and the corre-sponding environmental drivers, and expand knowledge in bacterial assembly mechanisms in mining regions.

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第 35 条，共 300 条

标题: Efficient electrocatalysis for oxygen evolution: W-doped NiFe nanosheets with oxygen vacancies constructed by facile electrodeposition and corrosion

作者: Li, HX (Li, Huixi); Zhang, CY (Zhang, Chenyang); Xiang, WJ (Xiang, Weijun); Amin, MA (Amin, Mohammed A.); Na, J (Na, Jongbeom); Wang, SP (Wang, Shengping); Yu, JX (Yu, Jingxian); Yamauchi, Y (Yamauchi, Yusuke)

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Web of Science 核心合集中的 "被引频次": 15

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摘要: Electrochemical water splitting requires efficient electrocatalysts to accelerate the sluggish kinetics of the oxygen evolution reaction (OER). A promising nanoporous W-doped oxygen vacancy-containing NiFe layered double hydroxides (NiFeW-LDHs) electrocatalyst is directly grown on nickel foam via electrodeposition combined with chemical corrosion. With an appropriate amount of W dopant in NiFe-LDHs, the electronic structures of Ni and Fe are modulated by the changes in local environment, and the oxygen vacancy concentration is further optimized, resulting in abundant OER electrocatalytic active centers on the electrocatalyst surface. Due to the excellent electronic conductivity and three-dimensional nanoporous configuration, the representative NiFeW3-LDHs exhibit remarkable OER electrocatalytic activity with a low overpotential (211 mV at 10 mA cm-2), a small Tafel slope (36.44 mV dec-1), and fine stability (more than 120 h at 10 mA cm-2). The oxygen vacancy effectively modifies the intrinsic electronic structure of NiFe-LDHs, optimizes the adsorption energy of intermediates, and accelerates the OER.

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第 36 条，共 300 条

标题: The rapid self-reconstruction of Fe-modified Ni hydroxysulfide for efficient and stable large-current-density water/seawater oxidation

作者: Huang, CQ (Huang, Chuqiang); Zhou, QC (Zhou, Qiancheng); Duan, DS (Duan, Dingshuo); Yu, L (Yu, Luo); Zhang, W (Zhang, Wei); Wang, ZZ (Wang, Zhouzhou); Liu, J (Liu, Jin); Peng, BW (Peng, Bowen); An, PF (An, Pengfei); Zhang, J (Zhang, Jing); Li, LP (Li, Liping); Yu, JG (Yu, Jiaguo); Yu, Y (Yu, Ying)

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摘要: The reasonable design of electrocatalysts with rapid self-reconstruction for an efficient oxygen evolution reaction (OER) at commercially required current densities is highly desirable but very challenging. Herein, ultrathin Fe-modified Ni hydroxysulfide (Fe-NiSOH) nanosheet arrays were grown in situ on Ni foam via a simple two-step oxidation strategy for efficient and stable large-current-density water/seawater oxidation. Systematic insights, including experimental and theoretical analysis, reveal that in situ S leaching from the electrode boosts its self-reconstruction and results in the more-ready generation of highly active Ni4+ species, which benefits from a reduced formation energy. Owing to its excellent physical and chemical properties, the Fe-NiSOH catalyst requires only low overpotentials of 207, 240, and 268 mV in alkaline water to deliver current densities of 10, 100, and 500 mA cm(-2), respectively, and it can work stably for 1100 hours at the commercially required current density of 500 mA cm(-2). Furthermore, it also exhibits excellent seawater oxidation activity and superior resistance to Cr corrosion, since it can run stably at 500 mA cm(-2) for over 900 hours. This work offers an efficient strategy to build rapidly self-reconstructing electrocatalysts to promote the formation of highly oxidized metal species for efficient and stable water/seawater oxidation.

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第 37 条，共 300 条

标题: Hierarchically porous nickel foam supported Fe-Ni3S2 electrode for high-current-density alkaline water splitting

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摘要: Alkaline water electrolysis (AWE) offers a promising route for green hydrogen production. However, its industrial application is impeded by unsatisfactory energy conversion efficiency. Herein, a robust electrode composed of porous nickel foam (PNF) and Fe-doped Ni3S2 (Fe-Ni3S2) nanosheet arrays was fabricated and applied for industrial AWE. By conducting a scalable dynamic bubble-template method, PNF with high loading of active catalysts was prepared. The superhydrophilicity of PNF facilitates bubble detachment and promotes mass transfer, especially at high current densities. In addition, Fe-Ni3S2 with optimized electronic structure is featured with enhanced electrical conductivity, sufficient exposure of active sites, and optimized adsorption of intermediates. Benefiting from the concerted advantages of PNF and Fe-Ni3S2, the obtained Fe-Ni3S2/PNF-5 electrode with an optimal Fe content of 5 mol% exhibits high catalytic activity for both hydrogen evolution reaction (HER) and oxygen evolution reaction (OER). Compared with the Pt/C/NF||IrO2/NF couple, the Fe-Ni3S2/PNF-5||Fe-Ni3S2/PNF-5 couple delivers a current density of 10 mA cm(-2) at a low cell voltage of 1.50 V for AWE. Under industrial conditions, a competitive cell voltage of 1.75 V is needed for achieving a high current density of 400 mA cm(-2). Besides, the couple can operate stably for 120 h, outperforming the commercial RN||RN couple. This work provides a novel strategy to elevate the loading amount of catalysts and improve the electrochemical performance of the electrode for practical AWE application.(c) 2022 Elsevier Inc. All rights reserved.

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第 38 条，共 300 条

标题: Achieving high energy storage density and efficiency simultaneously in Sr(Nb0.5Al0.5)O-3 modified BiFeO3 based lead-free ceramics

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摘要: Environmentally friendly BiFeO3-based capacitors have attracted great attention in energy storage applications. Via a design of crossover relaxor ferroelectric state with high maximum polarization and small remanent polarization at moderate electric fields, a large W-rec of 3.95 J/cm(3) and an excellent of 85.9 % was obtained in 0.85 (0.67BiFeO(3)-0.33BaTiO(3))-0.15Sr(Nb-0.5 Al-0.5)O-3 crossover relaxor ceramic. The addition of Sr(Nb0.5Al0.5)O-3 facilitates to the formation of crossover relaxor ferroelectric state and suppresses the early polarization saturation. The breakdown strength of Sr(Nb0.5Al0.5)O-3 modified ceramics is enhanced due to the significantly decreased grain size and the increased band gap. More importantly, the X = 0.15 ceramic exhibits an excellent thermal stability (25-110 degrees C), frequency stability (1-300 Hz), fatigue endurance (after 10 5 cycles), and fast discharge rate (t(0.9) similar to 0.108 mu s) at 140 kV/cm. These results indicate that the BF-BT-0.15SNA ceramic is a promising dielectric energy storage material.

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第 39 条，共 300 条

标题: Fabrication of multifunctional biomass-based aerogel with 3D hierarchical porous structure from waste reed for the synergetic adsorption of dyes and heavy metal ions

作者: Liu, YY (Liu, Yanyang); Ke, YL (Ke, Yangli); Shang, QG (Shang, Qigao); Yang, XF (Yang, Xiaofang); Wang, DS (Wang, Dongsheng); Liao, GY (Liao, Guiying)

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摘要: The serious environmental pollution and ecological risks caused by dyeing wastewater and waste reed is the urgent problem to be solved. Here, a multifunctional biomass-based aerogel (CE/CSA) was synthesized using cellulose (CE, extracted from waste reed) and chitosan (CS), and it exhibited abundant three - dimensional (3D) hierarchical porous structure with low density (0.062 g/cm3). The maximum adsorption amount of CE/CSA-1 for Congo red (CR) and Cu2+ was 380.23 mg/g and 260.41 mg/g when they coexisted in water, which increase by 49.05 % and 28.64 % compared with that in the single system, respectively. The result suggested that the preloaded CR could provide new adsorption sites (-NH2/-SO3- ) to bridge free Cu2+ in the solution. Likewise, the preabsorbed Cu2+ had the same mutual bridging effect toward free CR, which achieved a synergistic effect between CR and Cu2+ onto CE/CSA-1. Furthermore, the fixed-bed column adsorption experiments for CR demonstrated the adsorption amount of CE/CSA-1 was reached to 241.00 mg/g, and the breakthrough curves were fitted by the Thomas and Yoon-Nelson models. Therefore, the as-prepared biomass-based aerogel derived from waste reed can be considered as a promising adsorbent for the treatment of dyeing wastewater including dyes and heavy metal ions.

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第 40 条，共 300 条

标题: Genetic mechanism of transfer zones in rift basins: Insights from geomechanical models

作者: Liu, JS (Liu, Jingshou); Yang, HM (Yang, Haimeng); Xu, K (Xu, Ke); Wang, ZM (Wang, Zhimin); Liu, XY (Liu, Xinyu); Cui, LJ (Cui, Lijie); Zhang, GJ (Zhang, Guanjie); Liu, Y (Liu, Yang)

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摘要: A transfer zone is a kind of structure that is produced to conserve deformation of a fault structure on both sides. Increasing numbers of transfer zones are being identified in rift basins, which are areas of petroleum accumulation and potential exploration targets. This paper provides a numerical simulation method for the genesis and development of transfer zones based on geomechanical modeling. On the basis of three-dimensional (3-D) seismic interpretation, using the Tongcheng fault as an example, the fault activity parameter and fault activity intensity index were established to quantitatively characterize the difference in fault activity on the two sides of a transfer zone. A geomechanical model was developed for a transfer zone in a rift basin, and the structural characteristics and genetic mechanism of a convergent fault were studied using paleostress and strain numerical simulations. Affected by different movements of boundary faults and basement faults, the evolution of the Tongcheng fault can be divided into three stages: (1) during the Funing period, which was the main development period of compound transfer faults, the activity, stress, and strain of the fault blocks on either side of the Tongcheng fault were obviously different; (2) during the Dainan period, which was the development stage of inherited compound transfer faults, the northern part of the Tongcheng area underwent local compression, and the T3 anticline began to form; and (3) during the Sanduo period, the Tongcheng fault experienced right-lateral strike-slip activity, where the activity showed two stages of change, first increasing and then decreasing, and the Tongcheng fault anticline developed. The superposition of multiple complex tectonic movements produced a transfer zone that has both strike-slip and extensional fault properties. The geomechanical model in this paper provides important insights for analyzing the evolution of transfer zones in rift basins.

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第 41 条，共 300 条

标题: Bifurcation structures of a Leslie-Gower model with diffusion and advection

作者: Qiu, HH (Qiu, Huanhuan); Guo, SJ (Guo, Shangjiang)

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摘要: This paper is devoted to a modified Leslie-Gower model with diffusion and advec-tion. By regarding the advection coefficient as a bifurcation parameter, we obtain the local and global structure of nonconstant positive steady states bifurcating from the homogeneous steady states in multi-dimension by the asymptotic analysis and bifurcation theory.(c) 2022 Elsevier Ltd. All rights reserved.

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第 42 条，共 300 条

标题: Cooperative Coupling of H2O2 Production and Organic Synthesis over a Floatable Polystyrene-Sphere-Supported TiO2/Bi2O3 S-Scheme Photocatalyst

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来源出版物: ADVANCED MATERIALS 卷: 34 期: 38 文献号: 2203225 DOI: 10.1002/adma.202203225 提前访问日期: AUG 2022 出版年: SEP 2022

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摘要: Cooperative coupling of photocatalytic H2O2 production with organic synthesis has an expansive perspective in converting solar energy into storable chemical energy. However, traditional powder photocatalysts suffer from severe agglomeration, limited light absorption, poor gas reactant accessibility, and reusable difficulty, which greatly hinders their large-scale application. Herein, floatable composite photocatalysts are synthesized by immobilizing hydrophobic TiO2 and Bi2O3 on lightweight polystyrene (PS) spheres via hydrothermal and photodeposition methods. The floatable photocatalysts are not only solar transparent, but also upgrade the contact between reactants and photocatalysts. Thus, the floatable step-scheme (S-scheme) TiO2/Bi2O3 photocatalyst exhibits a drastically enhanced H2O2 yield of 1.15 mm h(-1) and decent furfuryl alcohol conversion to furoic acid synchronously. Furthermore, the S-scheme mechanism and dynamics are systematically investigated by in situ irradiated X-ray photoelectron spectroscopy and femtosecond transient absorption spectrum analyses. In situ Fourier transform infrared spectroscopy and density functional theory calculations reveal the mechanism of furoic acid evolution. The ingenious design of floatable photocatalysts not only furnishes insight into maximizing photocatalytic reaction kinetics but also provides a new route for highly efficient heterogeneous catalysis.

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标题: Science Requirements and Detector Concepts for the Electron-Ion Collider

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摘要: This report describes the physics case, the resulting detector requirements, and the evolving detector concepts for the experimental program at the Electron-Ion Collider (EIC). The EIC will be a powerful new high-luminosity facility in the United States with the capability to collide high-energy electron beams with high-energy proton and ion beams, providing access to those regions in the nucleon and nuclei where their structure is dominated by gluons. Moreover, polarized beams in the EIC will give unprecedented access to the spatial and spin structure of the proton, neutron, and light ions. The studies leading to this document were commissioned and organized by the EIC User Group with the objective of advancing the state and detail of the physics program and developing detector concepts that meet the emerging requirements in preparation for the realization of the EIC. The effort aims to provide the basis for further development of concepts for experimental equipment best suited for the science needs, including the importance of two complementary detectors and interaction regions.

This report consists of three volumes. Volume I is an executive summary of our findings and developed concepts. In Volume II we describe studies of a wide range of physics measurements and the emerging requirements on detector acceptance and performance. Volume III discusses general-purpose detector concepts and the underlying technologies to meet the physics requirements. These considerations will form the basis for a world-class experimental program that aims to increase our understanding of the fundamental structure of all visible matter.

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标题: Z-scheme systems: From fundamental principles to characterization, synthesis, and photocatalytic fuel-conversion applications

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摘要: Z-scheme photocatalysts have recently received tremendous attention because of their extraordinary light harvesting and utilization ability, spatially-separated reductive and oxidative active sites, and strong redox capacity. This review depicts a panorama of the latest discoveries and developments of Z-scheme photocatalysts for solar-driven fuel production. It starts with the fundamental principles of Z-scheme photocatalysts. Subsequently, the characterization technologies and synthesis methods for Z-scheme photocatalysts are also presented. Afterwards, a series of representative Z-scheme photocatalysts for photocatalytic fuel-conversion applications, e.g., water splitting, CO2 reduction, N-2 fixation, and H2O2 production are exemplified. Lastly, this review also provides some new viewpoints into the major challenges, opportunities, and encouraging perspectives for future researches. It is clear that Z-scheme heterojunctions could act as highly efficient photocatalysts to achieve new breakthroughs for diverse photocatalytic fuel-conversion applications. (C) 2022 Elsevier B.V. All rights reserved.

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标题: Enhanced Photocatalytic H2O2 Production over Inverse Opal ZnO@ Polydopamine S-Scheme Heterojunctions

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摘要: Photocatalytic H2O2 production is a sustainable and inexpensive process that requires water and gaseous O-2 as raw materials and sunlight as the energy source. However, the slow kinetics of current photocatalysts limits its practical application. ZnO is commonly used as a photocatalytic material in the solar-to-chemical conversion, owing to its high electron mobility, nontoxicity, and relatively low cost. The adsorption capacity of H2O2 on the ZnO surface is low, which leads to the continuous production of H2O2. However, its photoresponse is limited to the ultraviolet (UV) region due to its wide bandgap (3.2 eV). Polydopamine (PDA) has emerged as an effective surface functionalization material in the field of photocatalysis due to its abundant functional groups. PDA can be strongly anchored onto the surface of a semiconducting photocatalyst through covalent and noncovalent bonds. The superior properties of PDA served as a motivation for this study. Herein, we prepare an inverse opal-structured porous PDA-modified ZnO (ZnO@PDA) photocatalyst by in situ self-polymerization of dopamine hydrochloride. The crystal structure, morphology, valency, stability, and energy band structure of photocatalysts are characterized by X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), transmission electron microscopy (TEM), field-emission scanning electron microscopy (FE-SEM), X-ray photoelectron spectroscopy (XPS), UV-visible diffuse reflectance spectroscopy (UV-Vis DRS), electrochemical impedance spectroscopy (EIS), Mott-Schottky curve (MS), and electron paramagnetic resonance (EPR). The experimental results showed that electrons in PDA are transferred to ZnO upon contact, which results in an electric field at their interface in the direction from PDA to ZnO. The photoexcited electrons in the ZnO conduction bands flow into PDA, driven by the electric field and bent bands, and are recombined with the holes of the highest occupied molecular orbital of PDA, thereby exhibiting an S-scheme charge transfer. This unique S-scheme mechanism ensures effective electron/hole separation and preserves the strong redox ability of used photocarriers. In addition, the inverse opal structure of ZnO@PDA promotes light- harvesting due to the supposed "slow photon" effect, as well as Bragg diffraction and scattering. Moreover, the enhanced surface area provides a high adsorption capacity and increased active sites for photocatalytic reactions. Therefore, the resulting ZnO@PDA (0.03% (atomic fraction) PDA) exhibits the optimal H2O2 production performance (1011.4 mu mol.L-1.h(-1)), which is 4.4 and 8.9 times higher than pristine ZnO and PDA, respectively. The enhanced performance is ascribed to the improved light absorption, efficient charge separation, and strong redox capability of photocarriers in the S-scheme heterojunction. Therefore, this study provides a novel strategy for the design of inorganic/organic S-scheme heterojunctions for efficient photocatalytic H2O2 production.

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标题: A comprehensive comparison among metaheuristics (MHs) for geohazard modeling using machine learning: Insights from a case study of landslide displacement prediction

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摘要: Machine learning (ML) has been extensively applied to model geohazards, yielding tremendous success. However, researchers and practitioners still face challenges in enhancing the reliability of ML models. In the present study, a systematic framework combining k-fold cross-validation (CV), metaheuristics (MHs), support vector regression (SVR), and Friedman and Nemenyi tests was proposed to improve the reliability and performance of geohazard modeling. The average normalized mean square error (NMSE) from k-fold CV sets was adopted as the fitness metric. Twenty of the most well-established MHs and the most recent MHs were adopted to tune the hyperparameters of SVR and were evaluated through nonparametric Friedman and post hoc Nemenyi tests to identify significant differences. Observations from a typical reservoir landslide were selected as a benchmark dataset, and the accuracy, robustness, computational time, and convergence speed of the MHs were compared. Significant performance differences among the twenty MHs were identified by Friedman and post hoc Nemenyi tests of the mean absolute error (MAE), root mean squared error (RMSE), Kling-Gupta efficiency (KGE), and computational time, with p values lower than 0.05. The comparison of results demonstrated that the multiverse optimizer (MVO) is among the highest-performing, most stable, and computationally efficient algorithms, providing superior performance to other methods, with nearly optimum values of the correlation coefficient (R), a low MAE (23.5086 versus 23.9360), a low mean RMSE (48.6946 versus 50.1882), and a high mean KGE (0.9803 versus 0.9893) in predicting the displacement of the Shuping landslide. This paper considerably enriches the literature regarding hyperparameter optimization algorithms and the enhancement of their reliability. In addition, Friedman and post hoc Nemenyi tests have the potential for evaluating and comparing various ML-based geohazard models.

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标题: Unraveling diverse survival strategies of microorganisms to vanadium stress in aquatic environments

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摘要: Worldwide vanadium contamination is posing serious risks to ecosystems. Although abilities of microbial communities to cope with vanadium stress using specific survival strategies have been reported, little is known regarding their relative importance and the underlying detoxification/tolerance mechanisms. Herein, we investigated the potential survival strategies of microbial communities and associated pathways in aquatic environments based on geochemistry and molecular biology. High vanadium content was observed for both water (12.6 & PLUSMN; 1.15 mg/L) and sediment (1.18 x 10(3) & PLUSMN; 10.4 mg/kg) in the investigated polluted stream. Co-occurrence network investigation implied that microbial communities showed cooperative interactions to adapt to the vanadium-polluted condition. Vanadium was also characterized as one of the vital factors shaping the community structure via redundancy analysis and structural equation models. Based on the metagenomic technology, three survival strategies including denitrification pathway, electron transfer, and metal resistance in innate microbes under the vanadium stress were revealed, with comprehensively summarized vanadium detoxification/tolerance genes. Remarkable role of electron transfer genes and the prevalent existence of resistance genes during detoxifying vanadium were highlighted. Overall, these findings provide novel insights into survival strategies under the vanadium contamination in aquatic environments, which can be of great significance for the identification, isolation, and application of vanadium reducing bacteria in vanadium bioremediation.

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第 48 条，共 300 条

标题: A critical review of mineral-microbe interaction and co-evolution: mechanisms and applications

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摘要: Mineral-microbe interactions play important roles in environmental change, biogeochemical cycling of elements and formation of ore deposits. Minerals provide both beneficial (physical and chemical protection, nutrients, and energy) and detrimental (toxic substances and oxidative pressure) effects to microbes, resulting in mineral-specific microbial colonization. Microbes impact dissolution, transformation and precipitation of minerals through their activity, resulting in either genetically controlled or metabolism-induced biomineralization. Through these interactions, minerals and microbes co-evolve through Earth history. Mineral-microbe interactions typically occur at microscopic scale but the effect is often manifested at global scale. Despite advances achieved through decades of research, major questions remain. Four areas are identified for future research: integrating mineral and microbial ecology, establishing mineral biosignatures, linking laboratory mechanistic investigation to field observation, and manipulating mineral-microbe interactions for the benefit of humankind.

Minerals and microbes interact and coevolve through flow of energy and exchange of matter, and their interactions play important roles in driving major geological events and ore deposit formation.

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第 49 条，共 300 条

标题: Metaheuristic-based support vector regression for landslide displacement prediction: a comparative study

作者: Ma, JW (Ma, Junwei); Xia, D (Xia, Ding); Guo, HX (Guo, Haixiang); Wang, YK (Wang, Yankun); Niu, XX (Niu, Xiaoxu); Liu, ZY (Liu, Zhiyang); Jiang, S (Jiang, Sheng)

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摘要: Recently, integrated machine learning (ML) metaheuristic algorithms, such as the artificial bee colony (ABC) algorithm, genetic algorithm (GA), gray wolf optimization (GWO) algorithm, particle swarm optimization (PSO) algorithm, and water cycle algorithm (WCA), have become predominant approaches for landslide displacement prediction. However, these algorithms suffer from poor reproducibility across replicate cases. In this study, a hybrid approach integrating k-fold cross validation (CV), metaheuristic support vector regression (SVR), and the nonparametric Friedman test is proposed to enhance reproducibility. The five previously mentioned metaheuristics were compared in terms of accuracy, computational time, robustness, and convergence. The results obtained for the Shuping and Baishuihe landslides demonstrate that the hybrid approach can be utilized to determine the optimum hyperparameters and present statistical significance, thus enhancing accuracy and reliability in ML-based prediction. Significant differences were observed among the five metaheuristics. Based on the Friedman test, which was performed on the root mean square error (RMSE), Kling-Gupta efficiency (KGE), and computational time, PSO is recommended for hyperparameter tuning for SVR-based displacement prediction due to its ability to maintain a balance between precision, computational time, and robustness. The nonparametric Friedman test is promising for presenting statistical significance, thus enhancing reproducibility.

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标题: Reduction of microbial diversity in grassland soil is driven by long-term climate warming

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摘要: Soil microbes control the cycling of carbon, but how these communities will respond to climate changes is unknown. Here, 7 years of artificial warming decreased microbial richness and diversity, driven mostly by soil moisture loss.

Anthropogenic climate change threatens ecosystem functioning. Soil biodiversity is essential for maintaining the health of terrestrial systems, but how climate change affects the richness and abundance of soil microbial communities remains unresolved. We examined the effects of warming, altered precipitation and annual biomass removal on grassland soil bacterial, fungal and protistan communities over 7 years to determine how these representative climate changes impact microbial biodiversity and ecosystem functioning. We show that experimental warming and the concomitant reductions in soil moisture play a predominant role in shaping microbial biodiversity by decreasing the richness of bacteria (9.6%), fungi (14.5%) and protists (7.5%). Our results also show positive associations between microbial biodiversity and ecosystem functional processes, such as gross primary productivity and microbial biomass. We conclude that the detrimental effects of biodiversity loss might be more severe in a warmer world.

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第 51 条，共 300 条

标题: Selection of targeted poverty alleviation policies from the perspective of land resources-environmental carrying capacity

作者: Zhang, HW (Zhang, Hongwei); Wang, ZQ (Wang, Zhanqi); Liu, JF (Liu, Jiafeng); Chai, J (Chai, Ji); Wei, C (Wei, Chao)

来源出版物: JOURNAL OF RURAL STUDIES 卷: 93 页: 318-325 DOI: 10.1016/j.jrurstud.2019.02.011 提前访问日期: JUN 2022 出版年: JUL 2022

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摘要: Selecting the appropriate targeted poverty alleviation policies and exploring the implementation path of refined poverty alleviation policies are important to provide support for achieving a comprehensive poverty alleviation for China in 2020. Two models, namely, land resources-environmental carrying capacity (LRECC) index and the coupling coordination degree (CCD), were established to quantitatively explore the important effects of differences in the LRECC in the production, living and ecological spaces on poverty, and determine the important role of superior carrying space in poverty alleviation. Additionally, this study explored the relationship between the poverty incidence and the LRECC by using of the coefficient of geographical association (CGA) to perform the priority and the optimal selection of targeted poverty alleviation policies from the production, living, and ecological spaces. Results showed that the comprehensive CGAs of Long Zhouping township, Huo Shaoping township and other townships were high; therefore, the priority of targeted poverty alleviation was high. By contrast, the comprehensive CGAs of Ya Zikou township, Du Zhenwan township, and other townships were low; thus, the priority of targeted poverty alleviation was low. Long Zhouping and Dayan townships should select the production aspect of targeted poverty alleviation policies, whereas Du Zhenwan and Ya Zikou townships and Gao Jiayan and Moshi townships should select the living and ecological aspects, respectively. Selecting the appropriate targeted poverty alleviation policies by quantitatively identifying the advantages of regional land resource endowment and the poverty incidence will help take the poor out of poverty, and do not become poor again, thereby achieving regional sustainable development.

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第 52 条，共 300 条

标题: Apatite halogens and Sr-O and zircon Hf-O isotopes: Recycled volatiles in Jurassic porphyry ore systems in southern Tibet

作者: Xu, B (Xu, Bo); Hou, ZQ (Hou, Zeng-Qian); Griffin, WL (Griffin, William L.); Yu, JX (Yu, Jia-Xing); Long, T (Long, Tao); Zhao, Y (Zhao, Yi); Wang, T (Wang, Tao); Fu, B (Fu, Bin); Belousova, E (Belousova, Elena); O'Reilly, SY (O'Reilly, Suzanne Y.)

来源出版物: CHEMICAL GEOLOGY 卷: 605 文献号: 120924 DOI: 10.1016/j.chemgeo.2022.120924 提前访问日期: JUN 2022 出版年: SEP 5 2022

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被引频次合计: 32

摘要: In-situ analysis of minerals, such as zircon hafnium (Hf) and oxygen (O) isotopes, has been pivotal in investigating magmatic evolution and related ore systems. In order to better constrain the petrogenesis of Cu-porphyries and related ore-forming processes in southern Tibet, we used a combined application of both zircon by Hf-O isotopes and apatite by developing geochemical indicators involving Sr-O isotopes and volatile (chlorine and sulfur) concentrations. Apatite has several advantages over zircon: it carries ore-related volatiles, is present in less-evolved magmas and is sensitive to magmatic processes. Data on major-and trace elements and Sr-O isotopes in gem-like apatite can supplement information from zircon Hf-O isotopes. We have applied these techniques to granitoids from the Jurassic arc in southern Tibet to illustrate their use in tracing volatile evolution and related genesis of porphyry systems. We demonstrate that (1) robust apatite Sr-O isotopes combined with zircon Hf-O isotopes can record recycled oceanic components in the sources of Gangdese Jurassic porphyries; (2) volatile enriched magmas metasomatised hydrous mantle wedge to form the Jurassic mineralised rocks; (3) the ore forming magma with higher contents of water, Cl and S, favoured the transfer of metals and volatiles to the upper crust and to form the Jurassic porphyry Cu-Au deposits.

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第 53 条，共 300 条

标题: Solar fuel generation over nature-inspired recyclable TiO2/g-C3N4 S-scheme hierarchical thin-film photocatalyst

作者: Wang, LB (Wang, Libo); Fei, XG (Fei, Xingang); Zhang, LY (Zhang, Liuyang); Yu, JG (Yu, Jiaguo); Cheng, B (Cheng, Bei); Ma, YH (Ma, Yuhua)

来源出版物: JOURNAL OF MATERIALS SCIENCE & TECHNOLOGY 卷: 112 页: 1-10 DOI: 10.1016/j.jmst.2021.10.016 出版年: JUN 10 2022

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摘要: Preparation of efficient photocatalysts with ease of recovery in solar fuel generation is highly desired to achieve carbon neutralization in carbon dioxide (CO2) emissions. Inspired from the forest with superior light penetration and fast gas transport, a TiO2/g-C3N4 composite nanowire arrays (NAs) film with maximized light utilization is devised. It is achieved by in-situ coating a thin layer of g-C3N4 (as the leaf) on the vertically-oriented TiO2 arrays (as tree trunks) on Ti foil (as soil). Benefiting from the effective charge separation by S-scheme charge transfer, intimate contact by the in-situ growth as well as the ingenious structure, the composite, readily recyclable, displays exciting performance in photocatalytic CO2 reduction. It is beyond doubt that the combination of heterojunction construction and "nature-inspired biomimetic photocatalyst" design promises practical applications and industrial use. (C) 2021 Published by Elsevier Ltd on behalf of Chinese Society for Metals.

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第 54 条，共 300 条

标题: Challenges for photocatalytic overall water splitting

作者: Bie, CB (Bie, Chuanbiao); Wang, LX (Wang, Linxi); Yu, JG (Yu, Jiaguo)

来源出版物: CHEM 卷: 8 期: 6 页: 1567-1574 DOI: 10.1016/j.chempr.2022.04.013 提前访问日期: JUN 2022 出版年: JUN 9 2022

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摘要: The hydrogen economy is a sunrise industry, which is considered the ultimate solution to power the future society. Photocatalytic overall water splitting is projected as a potential technology for H2 production. However, its performance is still far from meeting the criteria for large-scale production. This paper argues that photocatalytic overall water splitting is theoretically and practically hard to achieve. The limiting factors, including unfavorable thermodynamics, slow kinetics, dissolved oxygen, and rapid backward reaction, are discussed. This paper is expected to give readers a better understanding of the photocatalytic overall water splitting and analyze the associated challenges in every subtle aspect.

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第 55 条，共 300 条

标题: Non-Noble Plasmonic Metal-Based Photocatalysts

作者: Sayed, M (Sayed, Mahmoud); Yu, JG (Yu, Jiaguo); Liu, G (Liu, Gang); Jaroniec, M (Jaroniec, Mietek)

来源出版物: CHEMICAL REVIEWS 卷: 122 期: 11 页: 10484-10537 DOI: 10.1021/acs.chemrev.1c00473 出版年: JUN 8 2022

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摘要: Solar-to-chemical energy conversion via heterogeneous photocatalysis is one of the sustainable approaches to tackle the growing environmental and energy challenges. Among various promising photocatalytic materials, plasmonic-driven photocatalysts feature prominent solar-driven surface plasmon resonance (SPR). Non-noble plasmonic metals (NNPMs)-based photocatalysts have been identified as a unique alternative to noble metal-based ones due to their advantages like earth-abundance, cost-effectiveness, and large-scale application capability. This review comprehensively summarizes the most recent advances in the synthesis, characterization, and properties of NNPMs-based photocatalysts. After introducing the fundamental principles of SPR, the attributes and functionalities of NNPMs in governing surface/interfacial photocatalytic processes are presented. Next, the utilization of NNPMs-based photocatalytic materials for the removal of pollutants, water splitting, CO2 reduction, and organic transformations is discussed. The review concludes with current challenges and perspectives in advancing the NNPMs-based photocatalysts, which are timely and important to plasmon-based photocatalysis, a truly interdisciplinary field across materials science, chemistry, and physics.

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第 56 条，共 300 条

标题: Surface Design Strategy of Catalysts for Water Electrolysis

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来源出版物: SMALL 卷: 18 期: 27 文献号: 2202336 DOI: 10.1002/smll.202202336 提前访问日期: JUN 2022 出版年: JUL 2022

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摘要: Hydrogen, a new energy carrier that can replace traditional fossil fuels, is seen as one of the most promising clean energy sources. The use of renewable electricity to drive hydrogen production has very broad prospects for addressing energy and environmental problems. Therefore, many researchers favor electrolytic water due to its green and low-cost advantages. The electrolytic water reaction comprises the oxygen evolution reaction (OER) and the hydrogen evolution reaction (HER). Understanding the OER and HER mechanisms in acidic and alkaline processes contributes to further studying the design of surface regulation of electrolytic water catalysts. The OER and HER catalysts are mainly reviewed for defects, doping, alloying, surface reconstruction, crystal surface structure, and heterostructures. Besides, recent catalysts for overall water splitting are also reviewed. Finally, this review paves the way to the rational design and synthesis of new materials for highly efficient electrocatalysis.

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第 57 条，共 300 条

标题: Three-dimensional wave propagation in a solid pile during torsional low strain integrity test

作者: Zhang, YP (Zhang, Yunpeng); Wang, ZQ (Wang, Zongqin); El Naggar, MH (El Naggar, M. Hesham); Wu, WB (Wu, Wenbing); Wang, LX (Wang, Lixing); Jiang, GS (Jiang, Guosheng)

来源出版物: INTERNATIONAL JOURNAL FOR NUMERICAL AND ANALYTICAL METHODS IN GEOMECHANICS 卷: 46 期: 12 页: 2398-2411 DOI: 10.1002/nag.3389 提前访问日期: JUN 2022 出版年: AUG 2022

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摘要: The torsional low strain integrity test (TLSIT) is now regarded as the most potent alternative to the longitudinal wave test for the existing pile evaluation. However, the lack of the 3D wave theory for the TLSITs greatly hinders the application of this method. This paper establishes a coupled 3D soil-pile model based on the continuum theory. A corresponding analytical solution of the dynamic pile response is derived and subsequently verified through the comparisons against the 1D wave theory and the Finite Difference Method. The proposed model exhibits the transverse wave interferences and finds: (1) The transverse wave interference that occurred during the TLSITs can be seen gradually alleviated from the pile center to the pile edge. (2) The larger the pile dimensions are, the greater the transverse wave interference would be.

入藏号: WOS:000804708700001

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第 58 条，共 300 条

标题: Determination of shale macroscale modulus based on microscale measurement: A case study concerning multiscale mechanical characteristics

作者: Li, Y (Li, Yong); Chen, JQ (Chen, Jian-Qi); Yang, JH (Yang, Jiang-Hao); Liu, JS (Liu, Ji-Shan); Tong, WS (Tong, Wang-Shu)

来源出版物: PETROLEUM SCIENCE 卷: 19 期: 3 页: 1262-1275 DOI: 10.1016/j.petsci.2021.10.0041995-8226 出版年: JUN 2022

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摘要: Shale mechanical properties are important for shale gas production, but the magnitudes are difficult to estimate, standard size cores are hard to sample, and secondary interstice generation is inevitable. This paper proposes a method for determining shale macroscale modulus, which is determined at a hierarchy of scales from the nano-to macro-scales. Microscale measurements are upscaled to estimate the corresponding magnitudes at the macroscale. A case study is conducted with Silurian shale samples, using the hierarchy scales, gridding nanoindentation, atomic force microscopy (AFM), mineral liberation analysis (MLA), X-ray diffraction (XRD), and uniaxial compression tests. The mineral compositions are analyzed using MLA and XRD, and the shale composition is described in terms of clay minerals, organic matter, and siliceous and carbonate contents. The variation in the Young's modulus is analyzed based on the recorded indentation depth curves and modulus distributions. The nanoindentation and AFM results are upscaled to the centimeter scale through the Mori-Tanaka method. The upscaled results exhibit satisfactory fitting with the conventional uniaxial compression results, although the fitting of the upscaled AFM results is better than nanoindentation. The proposed approach can be applied to promptly and comprehensively predict the shale mechanical parameters during shale gas exploration. (c) 2021 The Authors. Publishing services by Elsevier B.V. on behalf of KeAi Communications Co. Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/ 4.0/).

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第 59 条，共 300 条

标题: More Than Privacy: Applying Differential Privacy in Key Areas of Artificial Intelligence

作者: Zhu, TQ (Zhu, Tianqing); Ye, DY (Ye, Dayong); Wang, W (Wang, Wei); Zhou, WL (Zhou, Wanlei); Yu, PLS (Yu, Philip S.)

来源出版物: IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 卷: 34 期: 6 页: 2824-2843 DOI: 10.1109/TKDE.2020.3014246 出版年: JUN 1 2022

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摘要: Artificial Intelligence (AI) has attracted a great deal of attention in recent years. However, alongside all its advancements, problems have also emerged, such as privacy violations, security issues and model fairness. Differential privacy, as a promising mathematical model, has several attractive properties that can help solve these problems, making it quite a valuable tool. For this reason, differential privacy has been broadly applied in AI but to date, no study has documented which differential privacy mechanisms can or have been leveraged to overcome its issues or the properties that make this possible. In this paper, we show that differential privacy can do more than just privacy preservation. It can also be used to improve security, stabilize learning, build fair models, and impose composition in selected areas of AI. With a focus on regular machine learning, distributed machine learning, deep learning, and multi-agent systems, the purpose of this article is to deliver a new view on many possibilities for improving AI performance with differential privacy techniques.

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第 60 条，共 300 条

标题: The Dynamic Privacy-Preserving Mechanisms for Online Dynamic Social Networks

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摘要: Networks that constantly transmit information and change structure are becoming increasingly prevalent. However, traditional privacy models are designed to protect static information, such as records in a database or a person's profile information, which seldom changes. This conflict between static models and dynamic environments is dramatically hindering the effectiveness and efficiency of privacy preservation in today's dynamic world. Hence, in this paper, we formally define the concept of dynamic privacy, present two novel perspectives, privacy propagation and accumulation, on the way private information can spread through dynamic cyberspace, and develop associated theories and mechanisms for preserving privacy in advanced complex networks, such as social networking sites where data are constantly being released, shared, and exchanged.

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第 61 条，共 300 条

标题: A Pareto-based hybrid iterated greedy algorithm for energy-efficient scheduling of distributed hybrid flowshop

作者: Lu, C (Lu, Chao); Liu, Q (Liu, Qiao); Zhang, B (Zhang, Biao); Yin, L (Yin, Lvjiang)

来源出版物: EXPERT SYSTEMS WITH APPLICATIONS 卷: 204 文献号: 117555 DOI: 10.1016/j.eswa.2022.117555 提前访问日期: MAY 2022 出版年: OCT 15 2022

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摘要: Due to its practicality, hybrid flowshop scheduling problem (HFSP) with productivity objective has been extensively explored. However, studies on HFSP considering green objective in distributed production environment are quite limited. Moreover, the current manufacturing mode is gradually evolving toward distributed coproduction mode. Thus, this paper investigated a distributed hybrid flowshop scheduling problem (DHFSP) with objectives of minimization the makespan and total energy consumption (TEC). To address this problem, this paper designed a Pareto-based multi-objective hybrid iterated greedy algorithm (MOHIG) by integrating the merits of genetic operator and iterated greedy heuristic. In this MOHIG, firstly, one cooperative initialization strategy is proposed to boost initial solutions' quality based on the previous experience and rules. Secondly, one knowledge-based multi-objective local search method is invented to enhance the exploitation capability according to characteristics of problem. Thirdly, an energy-saving technique is developed to decrease the idle energy consumption of machine tools. Furthermore, the effectiveness of each improvement component of MOHIG is assessed by three common indicators. Finally, the proposed MOHIG algorithm is compared with other multi-objective optimization algorithms, including SPEA2, MOEA/D, and NSGAII. Experimental results indicate that the proposed MOHIG outperforms its compared algorithms in solving this problem. In addition, this research can better guide practical production in some certain environments.

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第 62 条，共 300 条

标题: Confined heterogeneous catalysis by boron nitride-Co3O4 nanosheet cluster for peroxymonosulfate oxidation toward ranitidine removal

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来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 435 文献号: 135126 DOI: 10.1016/j.cej.2022.135126 子辑: 3 出版年: MAY 1 2022

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摘要: Peroxymonosulfate (PMS) induced advanced oxidation processes hold great promise for heterogeneous oxidation reactions. In this study, boron nitride (BN)-Co3O4 nanosheet cluster (NC) was fabricated to facilitate PMS activation with a nanoconfined heterogeneous catalysis effect for the rapid removal of ranitidine (RAN) under mild conditions. The obtained BN-Co3O4 NC cluster exhibited efficient catalysis performance with a 99.5% removal efficiency for ranitidine in 5 min, and meanwhile this novel catalyst could be applied under a wide pH range (pH: 3-9) with still high degradation efficiencies. The porous structure of BN-Co3O4 NC provided a large number of channels for RAN and PMS molecules to enter the catalyst's inner confinement space, resulting in a remarkable enhancement of catalytic performance. The kinetic rate constant for RAN degradation by the BN-Co3O4 NC/PMS system with 3-33 fold less catalyst dosage is much larger (1.58-213 fold) compared with the state-of-the-art. PMS activation by BN-Co3O4 NC was mainly due to the pathway of reduction via active radicals. Density functional theory calculations specified that the concomitant active radicals such as center dot OH and SO4 center dot- were mainly derived from PMS activation via O-O bond cleavage. This work provides a new perspective for regulating the structure of Co3O4 and elucidating the mechanism of PMS-induced heterogeneous catalytic oxidation.

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第 63 条，共 300 条

标题: ZnO/COF S-scheme heterojunction for improved photocatalytic H2O2 production performance

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摘要: Covalent organic frameworks (COFs) are burgeoning crystalline porous materials with great potential in photocatalysis, but their applications are mainly restricted by the speedy recombination rate of charge carriers. Herein, a step-scheme heterojunction ZnO/COF(TpPa-Cl) is fabricated by a simple electrostatic self-assembly method, and its photocatalytic H2O2 production performance is also investigated. The S-scheme heterojunction between ZnO and TpPa-Cl contributes to enhanced light absorption, promoted reactant adsorption capacity, increased redox power, and efficient separation and transfer of photogenerated charge carriers, leading to an improved photocatalytic H2O2 evolution activity. The optimal composite possesses the maximum H2O2 evolution rate of 2443 mu mol.g(-1).h(-1) under simulated solar light irradiation, which is about 3.3 and 8.7 times higher than pristine ZnO nanoparticles and TpPa-Cl, respectively. Moreover, the charge transfer pathway in S scheme heterojunction photocatalysts is well elucidated. This investigation provides designing guidelines in the construction of other COF-based S-scheme heterojunctions.

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第 64 条，共 300 条

标题: Exploring a lost ocean in the Tibetan Plateau: Birth, growth, and demise of the Bangong-Nujiang Ocean

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摘要: The vast eastern-Tethyan oceanic domain that throughout the Mesozoic extended between Gondwana and Eurasia was a puzzle of larger and smaller microcontinents separated by larger and smaller oceans, the paleogeographic reconstruction of which poses major challenging problems. This review article summarizes the available stratigraphic, sedimentological, petrological, geochronological, geochemical, tectonic, and paleomagnetic evidence on the Bangong-Nujiang suture zone and adjacent geological domains now at the heart of the Tibetan Plateau, with the final aim to reconstruct the history of the Bangong-Nujiang Ocean from its birth to its growth and final demise. The vivid debate on these highly controversial geological issues touches on several key problems in plate tectonics, including the birth of an ocean, the nature of microcontinents and seamounts, the initiation of oceanic subduction, the implications of subduction polarity, and the timing of continental collision. Rifting between South Qiangtang and the Lhasa blocks took place in the Early to Middle Permian. The BangongNujiang Ocean was still narrow in the Late Permian. The Triassic saw the rapid northward drift of South Qiangtang and active sea-floor-spreading in the Bangong-Nujiang Ocean, which reached a maximum north-south width of-4000 km in about 50 million years. In the Early Jurassic (-190-180 Ma), Bangong-Nujiang oceanic lithosphere began to subduct northward. After some 30-40 million years of oceanic subduction, documented by arc magmatism and high-pressure metamorphic rocks, the Bangong-Nujiang Ocean closed its northern branch (the Dongqiao-Amdo ocean) in the latest Middle Jurassic (166-163 Ma), when the Amdo and Dongkacuo microcontinents collided with South Qiangtang. The southern oceanic branch (the Beila-Nagqu ocean) closed in the latest Jurassic (150-145 Ma) at the onset of collision between the Lhasa and Qiangtang blocks. Early Cretaceous (140-120 Ma) syncollisional arc-type magmatism was widely distributed in the Lhasa-Qiangtang collisional zone. At earliest Late Cretaceous time, the complete demise of seaways and the transition to widespread deposition of continental red beds along the Bangong-Nujiang suture zone marked the onset of intracontinental convergence leading to initial uplift of the Tibetan Plateau.

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标题: Highly efficient Fe3+-doped A(2)BB ' O-6 (A = Sr2+, Ca2+; B, B ' = In3+, Sb5+, Sn4+) broadband near-infrared-emitting phosphors for spectroscopic analysis

作者: Liu, DJ (Liu, Dongjie); Li, GG (Li, Guogang); Dang, PP (Dang, Peipei); Zhang, QQ (Zhang, Qianqian); Wei, Y (Wei, Yi); Qiu, L (Qiu, Lei); Molokeev, MS (Molokeev, Maxim S.); Lian, HZ (Lian, Hongzhou); Shang, MM (Shang, Mengmeng); Lin, J (Lin, Jun)

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摘要: Near-infrared (NIR)-emitting phosphor-converted light-emitting diodes have attracted widespread attention in various applications based on NIR spectroscopy. Except for typical Cr3+-activated NIR-emitting phosphors, next-generation Cr3+-free NIR-emitting phosphors with high efficiency and tunable optical properties are highly desired to enrich the types of NIR luminescent materials for different application fields. Here, we report the Fe3+-activated Sr2-yCay(InSb)(1-z)Sn2zO6 phosphors that exhibit unprecedented long-wavelength NIR emission. The overall emission tuning from 885 to 1005 nm with broadened full-width at half maximum from 108 to 146 nm was realized through a crystallographic site engineering strategy. The NIR emission was significantly enhanced after complete Ca2+ incorporation owing to the substitution-induced lower symmetry of the Fe3+ sites. The Ca2InSbO6:Fe3+ phosphor peaking at 935 nm showed an ultra-high internal quantum efficiency of 87%. The as-synthesized emission-tunable phosphors demonstrated great potential for NIR spectroscopy detection. This work initiates the development of efficient Fe3+-activated broadband NIR-emitting phosphors and opens up a new avenue for designing NIR-emitting phosphor materials.

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标题: Chemically Bonded alpha-Fe2O3/Bi4MO8Cl Dot-on-Plate Z-Scheme Junction with Strong Internal Electric Field for Selective Photo-oxidation of Aromatic Alcohols

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摘要: Inferior contact interface and low charge transfer efficiency seriously restrict the performance of heterojunctions. Herein, chemically bonded alpha-Fe2O3/Bi4MO8Cl (M=Nb, Ta) dot-on-plate Z-scheme junctions with strong internal electric field are crafted by an in situ growth route. Experimental and theoretical results demonstrate that the internal electric field provides a powerful driving force for vectorial migration of photocharges between Bi4MO8Cl and alpha-Fe2O3, and the interfacial Fe-O bond not only serves as an atomic-level charge flow highway but also lowers the charge transfer energy barrier, thereby accelerating Z-scheme charge transfer and realizing effective spatial charge separation. Impressively, alpha-Fe2O3/Bi4MO8Cl manifests a significantly improved photocatalytic activity for selective oxidation of aromatic alcohols into aldehydes (Con. >= 92 %, Sel. >= 96 %), with a performance improvement of one to two orders of magnitude. This work presents atomic-level insight into interfacial charge flow steering.

入藏号: WOS:000784253000001

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标题: Land use/land cover prediction and analysis of the middle reaches of the Yangtze River under different scenarios

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摘要: Land use and land cover (LULC) projections are critical for climate models to predict the impacts of LULC change on the Earth system. Different assumptions and policies influence LULC changes, which are a key factor in the decisions of planners and conservationists. Therefore, we predicted and analyzed LULC changes in future scenarios (SSP1-26, SSP2-45, SSP5-85) in the middle reaches of the Yangtze River basin (MYRB). We obtain historical (i.e., 2005-2020) LULC data from the Google Earth Engine (GEE) platform using the random forest (RF) classification method. LULC data for different future scenarios are also obtained by the driving factors of LULC changes in future shared socioeconomic pathways (SSPs), representative concentration pathways (RCPs) (SSP-RCP) scenarios (i.e., 2035-2095) and the patch-generated land use simulation (PLUS) model. The major findings are as follows: (1) simulation using the PLUS model based on the acquired classification data and the selected drivers can obtain accurate land use data in MYRB and a Kappa coefficient of 89.6% and 0.82, respectively; (2) as for the LULC changes in the MYRB, forests increased by 3.9% and decreased by 1.2% in the SSP1-26 and SSP5-85 scenarios, respectively, while farmland decreased by 9.2% and increased by 13.4% in SSP 1-26 and SSP 2-45, respectively, during 2080-2095; and (3) the main conversions in LULC in the MYRB were farmland to forest, forests/water bodies to farmland, and forests/grasslands to farmland/buildings in SSP1-2.6, SSP2-4.5, and SSP 5-8.5, respectively. This can be mainly attributed to gross domestic product (GDP), population (POP), temperature, and precipitation. Overall, this study not only contributes to the understanding of the mechanisms of LULC changes in the MYRB but also provides a basis for ecological and climatic studies.

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标题: Aggregation-induced emission luminogens for assisted cancer surgery

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摘要: Surgery is still one of the most important means of treating tumors. Fluorescence imaging-mediated surgical navigation and intraoperative phototherapy are considered to be effective ways to improve surgical outcomes. However, the lack of ideal imaging/phototherapy agents continues to be a barrier to their clinical application. Traditional imaging/phototherapy agents present some challenges in living organisms, such as aggregation caused quenching (ACQ), which cause a burst of fluorescent signal or loss of photosensitivity. The introduction of aggregation-induced emission (AIE) luminogens (AIEgens) promises to compensate for the challenges posed by ACQ fluorophores, in addition to their advantages such as high brightness/photostability/photosensitivity in aggregated states, large Stokes shift and excellent biocompatibility. This review focuses on some of the recently emerged AIE probes that are promising to assist the surgery, and systemically summarizes the strategies to solve the issues encountered during the applications of surgery navigation and intraoperative phototherapy. We emphasize the molecular design concept of the AIE probes, reveal their applications in intraoperative imaging and phototherapy, and comment on the existent insufficiency. This review aims to provide concepts for the design of AIE probes for addressing surgical navigation and intraoperative phototherapy, and to present the challenges faced in their clinical translation in order to enhance surgical outcomes in the future.(c) 2022 Elsevier B.V. All rights reserved.

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第 69 条，共 300 条

标题: S-scheme ZnO/WO 3 heterojunction photocatalyst for efficient H 2 O 2 production

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来源出版物: JOURNAL OF MATERIALS SCIENCE & TECHNOLOGY 卷: 124 页: 193-201 DOI: 10.1016/j.jmst.2022.01.029 提前访问日期: APR 2022 出版年: OCT 10 2022

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摘要: Designing highly efficient photocatalyst for hydrogen peroxide (H 2 O 2 ) production is an ideal strategy to avoid the shortcomings of traditional H 2 O 2 production and to realize the conversion of solar energy to chemical energy. In this work, a step-scheme (S-scheme) heterojunction photocatalyst composed of ZnO and WO 3 is carefully prepared by hydrothermal and calcination method for efficient photocatalytic H 2 O 2 production. The ZW30 composite photocatalysts exhibit enhanced activity with the highest H 2 O 2 production rate of 6788 mu mol L -1 h -1 . The results show that the photocatalytic H 2 O 2 production process is dominated by a direct two-electron O 2 reduction pathway. The enhanced photocatalytic H 2 O 2 production activity is attributed to the formation of interfacial internal electric field (IEF) in the S-scheme heterojunction, which boosts the spatial separation of charge carriers and enables electrons with the strongest reduction power to participate in H 2 O 2 production. This work provides an in-depth insight of the great advantages of S-scheme heterojunction in photocatalytic H 2 O 2 production. (c) 2022 Published by Elsevier Ltd on behalf of The editorial office of Journal of Materials Science & Technology.

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第 70 条，共 300 条

标题: Digital economy and carbon emission performance: Evidence at China's city level

作者: Zhang, W (Zhang, Wei); Liu, XM (Liu, Xuemeng); Wang, D (Wang, Die); Zhou, JP (Zhou, Jianping)

来源出版物: ENERGY POLICY 卷: 165 文献号: 112927 DOI: 10.1016/j.enpol.2022.112927 提前访问日期: APR 2022 出版年: JUN 2022

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摘要: This paper discusses the effect and mechanisms of digital economy (diec) on carbon emission performance (cop). Specifically, based on the panel data of 277 cities in China from 2011 to 2019, carbon emission performance and digital economy at the city level were evaluated through global super efficiency Epsilon-Based Measure (EBM) with unexpected output, and the vertical and horizontal scatter degree method, respectively. The OLS, mediation effect model, threshold model and spatial Durbin model (SDM) were adopted to investigate the nexus of diec and cop. The results show that: First, digital economy improves carbon emission performance, and this conclusion holds even after a series of robustness tests and endogenous treatment. The main impact mechanisms are energy intensity (ei), energy consumption scale (ec) and urban afforestation. And the effect and its impact mechanisms show regional heterogeneity. Second, under different levels of energy consumption structure, ei, ec, government intervention and urban afforestation, the impact of diec on cop is non-linear. Third, there's a spatial effect between diec and cop. The impact of diec on cop is significantly positive in local cities, while insignificant in the neighboring cities. Based on the above conclusions, specific recommendations are proposed for diec to improve cop.

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第 71 条，共 300 条

标题: EDCSuS: Sustainable Edge Data Centers as a Service in SDN-Enabled Vehicular Environment

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来源出版物: IEEE TRANSACTIONS ON SUSTAINABLE COMPUTING 卷: 7 期: 2 页: 263-276 DOI: 10.1109/TSUSC.2019.2907110 出版年: APR-JUN 2022

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摘要: Cloud computing has emerged as one of the popular technologies which provide on-demand services to the end users. Such services are hosted by massive geo-distributed data centers (DCs). Nowadays, connected vehicles in a smart city can also avail cloud services through Internet using cellular technologies. But, the advent of 5G technology has posed challenges for DCs such as-low latency and higher data rate requirements. To handle these challenges, edge-DCs (EDCs) can be deployed across a smart city to provide low latency services to the connected vehicles. In lieu of this, in this paper, EDCSuS: Sustainable EDC as a service framework in software defined vehicular environment is proposed. In EDCSuS, first, a software defined controller handles the incoming requests and suggest an optimal flow path. Second, a multi-leader multi-follower Stackelberg game is presented for resource allocation. Third, to improve the resource utilization, a cooperative resource sharing scheme is designed, thereby minimizing the energy consumption of servers in the EDCs. Lastly, a caching scheme is presented to avert excessive energy consumption for retracing the lost link due to vehicular mobility. The efficacy of the proposed scheme has been evaluated using extensive simulations with respect to various parameters. The results obtained prove the effectiveness of EDCSuS.

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第 72 条，共 300 条

标题: Impact of Power on Uneven Development: Evaluating Built-Up Area Changes in Chengdu Based on NPP-VIIRS Images (2015-2019)

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摘要: In the context of uneven development studies of China, urban built-up area changes are the index of the impact of power, as the local government is the only party that is able to acquire agricultural land and convert it to construction urban land. Existing studies generally use statistical data to describe the built-up area changes and struggle to meet the requirement of an updated and inexpensive monitoring of uneven development, especially for western cities with tight budgets. Open access NPP-VIIRS (Suomi National Polar-orbiting Partnership Visible Infrared Imaging Radiometer Suite), NDVI (Normalized Difference Vegetation Index), and nighttime LST (Land Surface Temperature) data ranging from 2015 to 2019 were analyzed with a stratified SVM (Support Vector Machine) method in this study to track urban built-up area changes in Chengdu, one of the biggest cities in Western China. The SDE (Standard Deviation Ellipse) and Moran's I were then applied to evaluate the spatial variations of the built-up area changes. It was revealed that the spatial evolution of built-up area change in Chengdu over the period 2015-2019 demonstrated a "northwest-southeast" spatial expansion pattern, and the change distance in the center of gravity in 2018 and 2019 was greater than that from 2015 to 2017, which reflected the faster uneven development in 2018 and 2019 in Chengdu. The results were verified with finer resolution Landsat-8 OLI images; the high OA (all larger than 92%) and KAPPA (all larger than 0.6) values showed the accuracy of the method. The methodology proposed in this study offers a practical way for cities with tight budgets to monitor uneven development, and this study suggests a further adaption using higher-resolution remote sensing images and field experiments.

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标题: Black phosphorus-based heterostructures for photocatalysis and photoelectrochemical water splitting

作者: Li, ST (Li, Shutao); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

来源出版物: JOURNAL OF ENERGY CHEMISTRY 卷: 67 页: 745-779 DOI: 10.1016/j.jechem.2021.11.023 出版年: APR 2022

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摘要: Semiconductor-based photocatalytic and photoelectrochemical (PEC) processes can convert solar energy into high-density chemical energy or for the treatment of environmental pollutants, which are ideal ways to deal with environmental and energy crises. The development of high-efficiency photocatalysts and photoelectrodes is the key to the in-depth development and practical application of the two technologies. Black phosphorus (BP) has excellent physicalcochemical properties such as adjustable band gap, high carrier mobility, large specific surface area and anisotropy, making it one of the most promising catalysts. BP-based heterostructure can not only realize the effective separation of photogenerated carriers but also improve the stability of BP, and is widely used in photocatalytic and PEC reactions. In this review, we first introduce the crystal structure, band structure, anisotropy, and preparation of BP with different dimensions (bulk, zero-dimension and two-dimension). Then, according to the transfer path of the photogenerated carriers and the components, the BP-based heterostructures are divided into type I heterojunction, type II heterojunction, Z-scheme heterojunction, S-scheme heterojunction, BP/carbonbased material heterostructure, BP/metal heterostructure and multi-component heterostructure. Highlighted are the diverse photocatalytic applications of BP-based heterostructure, such as water splitting and CO2 reduction, N-2 fixation, pollutant degradation, photothermal and photodynamic therapy. Finally, some concluding views and opinions are stated on the challenges and opportunities faced by the further development of BP-based heterostructures in photocatalysis and PEC water splitting. (C) 2021 Science Press and Dalian Institute of Chemical Physics, Chinese Academy of Sciences. Published by ELSEVIER B.V. and Science Press. All rights reserved.

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第 74 条，共 300 条

标题: Does carbon emissions trading promote green technology innovation in China?

作者: Zhang, W (Zhang, Wei); Li, GX (Li, Guoxiang); Guo, FY (Guo, Fanyong)

来源出版物: APPLIED ENERGY 卷: 315 文献号: 119012 DOI: 10.1016/j.apenergy.2022.119012 提前访问日期: MAR 2022 出版年: JUN 1 2022

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摘要: Carbon emissions trading is an important measure to promote high-quality economic development. Based on the panel data of 30 provincial administrative regions in China from 2008 to 2017, this paper uses the difference -indifferences method to analyze the impact of carbon emissions trading on green technology innovation. The results show that: (1) Carbon emissions trading inhibits green technology innovation in the current stage, but greatly reduces carbon emissions and carbon intensity; (2) Carbon price and R & D investment are the mainly working channels, carbon emissions trading has a crowding-out effect on corporates' R & D investment and increases the carbon trading price, which in turn inhibits green technology innovation; (3) Carbon emissions trading has a stronger inhibitory effect on green technology innovation in eastern regions and regions with low emission intensity. Local government competition positively moderates the green technology innovation effect of carbon emissions trading. However, the command-controlled environmental regulations and the scale of the carbon emission quota have opposite effects, with the compatibility of environmental regulation tools remaining to be resolved. Therefore, it is necessary to control the scale of carbon emission quota to diversify the subjects of carbon trading and strengthen the impact of market-incentive environmental regulation tools.

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第 75 条，共 300 条

标题: Spatio-temporal variation and coupling coordination relationship between urbanisation and habitat quality in the Grand Canal, China

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摘要: Urbanisation leads to dramatic changes in regional land use, which significantly affects habitat quality. Research on the coupling coordination relationship between urbanisation and habitat quality is conducive to promoting regional ecological environment improvement and urban sustainable development. In this article, we adopted the InVEST model and linear weighted sum method separately to evaluate the spatio-temporal variation characteristics of habitat quality and urbanisation level of the Grand Canal. Then, we used the coupling coordination degree model (CCDM) to investigate the interactive coercing relationship between urbanisation and habitat quality. The purpose was to provide reference for future implementation of ecological conservation work along the Grand Canal and formulation of sustainable urban development strategies. The results showed that habitat quality has continued to decline from 1990 to 2018. After becoming a world cultural heritage site, the habitat quality of the partial reaches has improved. The comprehensive urbanisation level and the four subsystem urbanisation levels, including demographic urbanisation, spatial urbanisation, economic urbanisation, and social urbanisation, of 35 cities along the Grand Canal have all steadily increased from 1990 to 2018. The social urbanisation level was obviously lower than the urbanisation levels of the other three dimensions in most cities along the Grand Canal, indicating that the quality of urbanisation seriously lags behind the speed. The coupling coordination degree (CCD) between the urbanisation level of each city and the habitat quality of the reaches in the corresponding city exhibited a fluctuating but increasing relationship. Most cities have developed in a more coordinated direction and very few cities have deteriorated. Meanwhile, the coupling coordination characteristics between urbanisation level and habitat quality have constantly changed, from the urbanisation lagged type to the urbanisation-habitat synchronised type and the habitat quality lagged type. This article has important value for implementing the ecological conservation and restoration projects of the Grand Canal, optimizing land management policies, and improving the sustainable development level of cities along the Grand Canal.

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标题: Geochemical Variations of the Late Paleozoic Granitoids from the Baolidao Arc-Accrection Belt in Southeastern Segment of Central Asia Orogenic Belt: Implications for Tectonic Transition from Early Carboniferous to Early Permian

作者: Zhang, XN (Zhang, Xueni); Zeng, QD (Zeng, Qingdong); Nie, FJ (Nie, Fengjun)

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摘要: Compositional changes in successively erupted felsic rocks can be used to infer physical changes in lower crustal conditions and to enhance the understanding of the tectonic regime. This study presents geochronological, geochemical and isotopic data for two I-type granitic plutons in the Sonid Left Banner of the Central Asian Orogenic Belt. Our new data, together with compiled I-type granitoid data, reveal the presence of magma compositional transition at similar to 305 Ma in the Baolidao arc-accretion belt. The early stage granitoids (330-305 Ma) are medium-K calc-alkaline with higher Sr/Y ratios. The late stage granitoids (305-270 Ma) are high-K calc-alkaline with lower Sr/Y ratios. The two-stage granitoids have roughly similar predominately positive Sr-Nd-Hf isotope values, but with a decreasing trend from the early to late stages. Geochemical data indicate that the early stage granitoids were generated by dehydration melting of juvenile mafic crust at amphibole-dominated depths. In contrast, the late stage granitoids were produced by dehydration melting of a mixed lithology containing juvenile K-rich mafic lower crust and supracrustal materials at the plagioclase-stable crustal level. We propose that the compositional transition of these granitoids can be linked with different slab behaviors of the northward subducting Paleo-Asian oceanic plate, and also with the back-arc tectonic settings.

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第 77 条，共 300 条

标题: Interior and Surface Synergistic Modifications Modulate the SnNb2O6/Ni-Doped ZnIn2S4 S-Scheme Heterojunction for Efficient Photocatalytic H-2 Evolution

作者: Li, CX (Li, Chunxue); Liu, XT (Liu, Xiaoteng); Ding, GX (Ding, Guixiang); Huo, PW (Huo, Pengwei); Yan, Y (Yan, Yan); Yan, YS (Yan, Yongsheng); Liao, GF (Liao, Guangfu)

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摘要: Interior and surface synergistic modifications can endow the photocatalytic reaction with tuned photogenerated carrier flow at the atomic level. Herein, a new class of 2D/2D SnNb2O6/Ni-doped ZnIn2S4 (SNO/Ni-ZIS) S-scheme heterojunctions is synthesized by a simple hydrothermal strategy, which was used to evaluate the synergy between interior and surface modifications. Theoretical calculations show that the S-scheme heterojunction boosts the desorption of H atoms for rapid H-2 evolution. As a result, 25% SNO/Ni-0.4-ZIS exhibits significantly improved PHE activity under visible light, roughly 4.49 and 2.00 times stronger than that of single ZIS and Ni-0.4-ZIS, respectively. In addition, 25% SNO/Ni-0.4-ZIS also shows superior structural stability. This work provides advanced insight for developing high-performance S-scheme systems from photocatalyst design to mechanistic insight.

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标题: Ultrahigh Photocatalytic CO2 Reduction Efficiency and Selectivity Manipulation by Single-Tungsten-Atom Oxide at the Atomic Step of TiO2

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摘要: The photocatalytic CO2 reduction reaction is a sustainable route to the direct conversion of greenhouse gases into chemicals without additional energy consumption. Given the vast amount of greenhouse gas, numerous efforts have been devoted to developing inorganic photocatalysts, e.g., titanium dioxide (TiO2), due to their stability, low cost, and environmentally friendly properties. However, a more efficient TiO2 photocatalyst without noble metals is highly desirable for CO2 reduction, and it is both difficult and urgent to produce selectively valuable compounds. Here, a novel "single-atom site at the atomic step" strategy is developed by anchoring a single tungsten (W) atom site with oxygen-coordination at the intrinsic steps of classic TiO2 nanoparticles. The composition of active sites for CO2 reduction can be controlled by tuning the additional W5+ to form W5+-O-Ti3+ sites, resulting in both significant CO2 reduction efficiency with 60.6 mu mol g(-)(1) h(-)(1) and selectivity for methane (CH4) over carbon monoxide (CO), which exceeds those of pristine TiO2 by more than one order of magnitude. The mechanism relies on the accurate control of the single-atom sites at step with 22.8% coverage of surface sites and the subsequent excellent electron-hole separation along with the favorable adsorption-desorption of intermediates at the sites.

入藏号: WOS:000770004700001

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输出日期: 2023-09-04

第 79 条，共 300 条

标题: Accumulation of microplastics in greenhouse soil after long-term plastic film mulching in Beijing, China

作者: Wang, K (Wang, Kang); Chen, W (Chen, Wei); Tian, JY (Tian, Jiayu); Niu, FQ (Niu, Fangqu); Xing, Y (Xing, Yu); Wu, YM (Wu, Yamei); Zhang, RX (Zhang, Ruixuan); Zheng, JS (Zheng, Jinsha); Xu, L (Xu, Li)

来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 828 文献号: 154544 DOI: 10.1016/j.scitotenv.2022.154544 提前访问日期: MAR 2022 出版年: JUL 1 2022

Web of Science 核心合集中的 "被引频次": 31

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摘要: Intensive use of plastic film and organic fertilizer in the greenhouse has resulted in microplastic contamination of soil. However, microplastic pollution in different types of greenhouses has not been reported so far. The contamination of microplastics in three different types of greenhouses (abandoned greenhouse, normal greenhouse, and simple greenhouse) were investigated. The abundance of microplastics in abandoned greenhouse reached as high as 2215.56 +/- 1549.86 items kg(-1), followed by normal greenhouse (891.11 +/- 316.71 items kg(-1)), and simple greenhouse (632.50 +/- 566.93 items kg(-1)). The mean abundance of microplastic organic fertilizer, and irrigation water were 1486.67 +/- 140.48 items kg(-1), and 4.2 items L-1, respectively. The abundance of microplastics in the shallow soils of abandoned greenhouse (826.67 +/- 261.02) and normal greenhouse (560.00 +/- 52.92 items kg(-1)) were lower than those in the deep soils (1073.33 +/- 306.16 and 720.00 +/- 111.36 items kg(-1)), while the simple greenhouse showed the opposite result. Microplastic was found to be primarily fragment-shaped, white in color, and 0-1 mm in size, and the polymers of microplastics were polypropylene (PP) and polyethylene (PE). White was the most frequently observed color in the abandoned greenhouse (46.1%) and normal greenhouse (32.2%), while the dominant color in the simple greenhouse was yellow (23.1%). This study provides first-hand data for the pollution characteristics of microplastics in different greenhouse soils and explores the primary sources of microplastics in the greenhouse soil.

入藏号: WOS:000804483000010

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第 80 条，共 300 条

标题: Centrifugal model test on a riverine landslide in the Three Gorges Reservoir induced by rainfall and water level fluctuation

作者: Miao, FS (Miao, Fasheng); Wu, YP (Wu, Yiping); Torok, A (Torok, Akos); Li, LW (Li, Linwei); Xue, Y (Xue, Yang)

来源出版物: GEOSCIENCE FRONTIERS 卷: 13 期: 3 文献号: 101378 DOI: 10.1016/j.gsf.2022.101378 提前访问日期: MAR 2022 出版年: MAY 2022

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被引频次合计: 36

摘要: Frequent soil landslide events are recorded in the Three Gorges Reservoir area, China, making it necessary to investigate the failure mode of such riverside landslides. Geotechnical centrifugal test is considered to be the most realistic laboratory model, which can reconstruct the required geo-stress. In this study, the Liangshuijing landslide in the Three Gorgers Reservoir area is selected for a scaled centrifugal model experiment, and a water pump system is employed to retain the rainfall condition. Using the techniques of digital photography and pore water pressure transducers, water level fluctuation is controlled, and multi-physical data are thus obtained, including the pore water pressure, earth pressure, surface displacement and deep displacement. The analysis results indicate that: Three stages were set in the test (waterflooding stage, rainfall stage and drainage stage). Seven transverse cracks with wide of 1-5 mm appeared during the model test, of which 3 cracks at the toe landslide were caused by reservoir water fluctuation, and the cracks at the middle and rear part were caused by rainfall. During rainfall process, the maximum displacement of landslide model reaches 3 cm. And the maximum deformation of the model exceeds 12 cm at the drainage stage. The failure process of the slope model can be divided into four stages: microcracks appearance and propagation stage, thrust-type failure stage, retrogressive failure stage, and holistic failure stage. When the thrust-type zone caused by rainfall was connected or even overlapped with the retrogressive failure zone caused by the drainage, the landslide would start, which displayed a typical composite failure pattern. The failure mode and deformation mechanism under the coupling actions of water level fluctuation and rainfall are revealed in the model test, which could appropriately guide for the analysis and evaluation of riverside landslides. (c) 2022 China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/ licenses/by-nc-nd/4.0/).

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第 81 条，共 300 条

标题: Phosphorus-enriched platinum diphosphide nanodots as a highly efficient cocatalyst for photocatalytic H-2 evolution of CdS

作者: Xu, JC (Xu, Jiachao); Zhong, W (Zhong, Wei); Gao, DD (Gao, Duoduo); Wang, XF (Wang, Xuefei); Wang, P (Wang, Ping); Yu, HG (Yu, Huogen)

来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 439 文献号: 135758 DOI: 10.1016/j.cej.2022.135758 提前访问日期: MAR 2022 出版年: JUL 1 2022

Web of Science 核心合集中的 "被引频次": 55

被引频次合计: 55

摘要: The number of catalytically active sites and their reaction efficiency are two crucial factors for cocatalyst applications in the field of photocatalytic hydrogen (H-2) evolution of semiconductor materials. Herein, a novel phosphorus-rich platinum diphosphide (P-rich PtP2) nanodot was developed to efficiently improve the photo activity of CdS by a facile phytic acid-assisted pyrolysis. The as-synthesized ultrafine PtP2 nanodots (2-5 nm) are evenly distributed on carbon layer (C) and further coupled with CdS to form PtP2@C/CdS photocatalyst via in situ sulfurization methods. Under visible-light irradiation, the obtained PtP2@C/CdS(10 wt%) photocatalyst presents an optimum H-2 evolution rate of 9.76 mmol g(-1)h(- 1)with apparent quantum efficiency (AQE) of 41.67% (420 nm), which is 2.2 and 34.8 times higher than that of Pt@C/CdS and blank CdS, respectively. Based on the results of related characterization and density functional theory calculations (DFT), the superior photocatalytic H-2-evolution performance of PtP2@C/CdS can be ascribed to the formation of the electron-enriched P(delta & nbsp;)in P-rich PtP2 nanodots, which can serve as the effective H-proton adsorption active site to greatly enhance the photo catalytic activity. This work provides a new perspective into exploiting active site-enriched cocatalyst for the development of high-efficiency photocatalyst.

入藏号: WOS:000790217400006

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ESI 热点论文: N

输出日期: 2023-09-04

第 82 条，共 300 条

标题: Exploring the impact of urban form on urban land use efficiency under low-carbon emission constraints: A case study in China's Yellow River Basin

作者: Wu, H (Wu, Hui); Fang, SM (Fang, Shiming); Zhang, C (Zhang, Can); Hu, SW (Hu, Shiwei); Nan, D (Nan, Ding); Yang, YY (Yang, Yuanyuan)

来源出版物: JOURNAL OF ENVIRONMENTAL MANAGEMENT 卷: 311 文献号: 114866 DOI: 10.1016/j.jenvman.2022.114866 提前访问日期: MAR 2022 出版年: JUN 1 2022

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摘要: In the Urban Anthropocene, how to meet the demands of growing urban populations on limited urban land is a key global challenge. Unreasonable urban planning and land use has brought about undesirable consequences including huge carbon emissions. However, research on the spatial impact of urban form on urban land use efficiency (ULUE) under low-carbon emission constraints is limited. This study analyzes 91 cities located in China's Yellow River Basin (YRB). First, we define a new comprehensive indicator system to measure ULUE under low-carbon constraints using the SBM-UN model. We then select nine landscape indicators to quantify the sprawl, complexity, and aggregation of urban form. Finally, we use Spatial Durbin Model to reveal the relationship between urban form and ULUE. We find that carbon emissions in the YRB increased steadily during the study period. The average value of ULUE increased from 0.469 in 1994 to 0.772 in 2018. Efficiency improved most in the provinces of Shaanxi, Henan, Ningxia, and Shandong, with growth rates of 234.15%, 102.40%, 93.09%, and 66.24%, respectively. Positive global Moran's I indices suggest that the spatial distribution of ULUE is positively correlated at basin level. Moreover, urban form metrics in the YRB demonstrated significant regional differences from 1994 to 2018. The regression results showed irregular urban form can negatively impact ULUE while compact and aggregated urban forms can improve ULUE under low carbon constrains. In addition, there are both positive and negative correlations between urban sprawl and ULUE in different regions. Today's choices on urban form can restrict the development pattern of cities and lock in pathways of carbon emissions in the future. Based on the findings in this study, the government should pursue optimal city sizes, avoid scattered patterns and aim for compact urban form.

入藏号: WOS:000820965100003

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第 83 条，共 300 条

标题: Application of a graph convolutional network with visual and semantic features to classify urban scenes

作者: Xu, YY (Xu, Yongyang); Jin, S (Jin, Shuai); Chen, ZL (Chen, Zhanlong); Xie, XJ (Xie, Xuejing); Hu, S (Hu, Sheng); Xie, Z (Xie, Zhong)

来源出版物: INTERNATIONAL JOURNAL OF GEOGRAPHICAL INFORMATION SCIENCE 卷: 36 期: 10 页: 2009-2034 DOI: 10.1080/13658816.2022.2048834 提前访问日期: MAR 2022 出版年: OCT 3 2022

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摘要: Urban scenes consist of visual and semantic features and exhibit spatial relationships among land-use types (e.g. industrial areas are far away from the residential zones). This study applied a graph convolutional network with neighborhood information (henceforth, named the neighbour supporting graph convolutional neural network), to learn spatial relationships for urban scene classification. Furthermore, a co-occurrence analysis with visual and semantic features proceeded to improve the accuracy of urban scene classification. We tested the proposed method with the fifth ring road of Beijing with an overall classification accuracy of 0.827 and a Kappa coefficient of 0.769. In comparison with other methods, such as support vector machine, random forest, and general graph convolutional network, the case study showed that the proposed method improved about 10% in urban scene classification.

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第 84 条，共 300 条

标题: Deep Downregulation of PD-L1 by Caged Peptide-Conjugated AIEgen/miR-140 Nanoparticles for Enhanced Immunotherapy

作者: Dai, J (Dai, Jun); Hu, JJ (Jing-Jing Hu); Dong, XQ (Dong, Xiaoqi); Chen, B (Chen, Biao); Dong, XY (Dong, Xiyuan); Liu, R (Liu, Rui); Xia, F (Xia, Fan); Lou, XD (Lou, Xiaoding)

来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 61 期: 18 文献号: e202117798 DOI: 10.1002/anie.202117798 提前访问日期: MAR 2022 出版年: APR 25 2022

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摘要: Downregulating programmed cell death ligand 1(PD-L1) protein levels in tumor cells is an effective way to achieve immune system activation for oncology treatment, but current strategies are inadequate. Here, we design a caged peptide-AIEgen probe (GCP) to self-assemble with miR-140 forming GCP/miR-140 nanoparticles. After entering tumor cells, GCP/miR-140 disassembles in the presence of Cathepsin B (CB) and releases caged GO203 peptide, miR-140 and PyTPA. Peptide decages in the highly reductive intracellular environment and binds to mucin 1 (MUC1), thereby downregulating the expression of PD-L1. Meanwhile, miR-140 reduces PD-L1 expression by targeting downregulation of PD-L1 mRNA. Under the action of PyTPA-mediated photodynamic therapy (PDT), tumor-associated antigens are released, triggering immune cell attack on tumor cells. This multiple mechanism-based strategy of deeply downregulating PD-L1 in tumor cells activates the immune system and thus achieves effective immunotherapy.

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第 85 条，共 300 条

标题: Exploring changes in landscape ecological risk in the Yangtze River Economic Belt from a spatiotemporal perspective

作者: Ran, PL (Ran, Penglai); Hu, SG (Hu, Shougeng); Frazier, AEE (Frazier, Amy E. E.); Qu, SJ (Qu, Shijin); Yu, D (Yu, De); Tong, LY (Tong, Luyi)

来源出版物: ECOLOGICAL INDICATORS 卷: 137 文献号: 108744 DOI: 10.1016/j.ecolind.2022.108744 提前访问日期: MAR 2022 出版年: APR 2022

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摘要: Landscape ecological risk reflects the extent to which ecosystems are threatened by human activities and environmental changes and is increasingly seen as the basis for decision-making in regional ecosystem management. Although the Yangtze River Economic Belt (YREB) has experienced drastic land use changes affected by human activities, the spatiotemporal heterogeneity of ecological risk in the region has not been thoroughly investigated. This study develops and applies an ecological risk assessment framework that integrates landscape pattern characteristics and landscape vulnerability dynamics to analyze spatiotemporal variations in landscape ecological risk in the YREB from 2000 to 2018. The results show moderate risk levels across most of the YREB during the study period, but risk was notably higher in the western and northern regions. Due to the gradual improvement in regional policies and the implementation of ecosystem restoration projects, there is a clear trend of risk reduction, and the area previously designated as high or medium-high risk was reduced by more than 150,000 km2 over the study period. Approximately 45% of the study area, where the risks are more difficult to mitigate or maintain at lower levels, was identified as a key area for future risk management. Significant spatiotemporal differences in ecological risks underscore the necessity of implementing spatially differentiated risk management strategies and long-term dynamic monitoring. This study provides a reference for future land use optimization and sustainable landscape management in the YREB.

入藏号: WOS:000773562400002

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第 86 条，共 300 条

标题: The impact assessment of FDI on industrial green competitiveness in China: Based on the perspective of FDI heterogeneity

作者: Liu, XM (Liu, Xuemeng); Zhang, W (Zhang, Wei); Liu, XR (Liu, Xiaorui); Li, H (Li, Hao)

来源出版物: ENVIRONMENTAL IMPACT ASSESSMENT REVIEW 卷: 93 文献号: 106720 DOI: 10.1016/j.eiar.2021.106720 出版年: MAR 2022

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摘要: Industrial green competitiveness has gradually become a core competitiveness for industrial development of a country in the world. Meanwhile, whether foreign direct investment (FDI) has pollution halo effect or pollution haven effect has always been the focus of academic debate. However, the impact assessment of FDI on the industrial green competitiveness in a large developing country, such as China, has received little attention. This paper first develops an evaluation system of China's industrial green competitiveness based on a panel dataset covering 30 provinces from 2001 to 2017 and adopts the meta-frontier, undesirable outputs and super slacks-based measure model to evaluate it. Then, this paper employs the dynamic spatial Durbin model (DSDM) to investigate the impact of FDI on China's industrial green competitiveness from the perspective of FDI quality, FDI quantity, and spatial spillover effects. The result indicates that the impact of FDI quality on industrial green competitiveness of a province and its neighbors is not significant. However, FDI quantity has a significantly negative effect on industrial green competitiveness of neighboring provinces, but an insignificant effect on that of the local province. Interestingly, the long term negative indirect effect of FDI quantity on industrial green competitiveness is not significant. Finally, FDI quality has a negative indirect effect on industrial green competitiveness in eastern and central China, while an insignificant effect in western China. A noteworthy phenomenon is that the long term negative indirect effect is greater than that of short term. Based on the above conclusions, specific recommendations for FDI to improve industrial green competitiveness are put forward for China and other developing countries.

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第 87 条，共 300 条

标题: Copper price forecasted by hybrid neural network with Bayesian Optimization and wavelet transform

作者: Liu, KL (Liu, Kailei); Cheng, JH (Cheng, Jinhua); Yi, JH (Yi, Jiahui)

来源出版物: RESOURCES POLICY 卷: 75 文献号: 102520 DOI: 10.1016/j.resourpol.2021.102520 出版年: MAR 2022

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摘要: The metal prices play an important role in many aspects of economics. Copper, a widely used metal in the industry, has received an extensive attention recently. Due to the high fluctuations in copper price that makes it difficult to predict especially when using the traditional statistical models, in this work, a hybrid Neural Network with Bayesian Optimization and Wavelet Transform is applied to forecast the copper price in both short- and long-terms, in which Bayesian Optimization Algorithm is used on the hyperparameter searching task, the Wavelet Transform is applied to denoise the data and eliminate the irrelevant information, and Long Short Time Memory (LSTM) and Gated Recurrent Units (GRU) are employed to train the data and predict future copper price, respectively. The results indicate that our methods, either LSTM or GRU, can appropriately predict the copper price for both short- and long-terms with mean squared error both below 3% and this hybrid Neural Network is robust to remove the irrelevant information and search the optimized set of hyperparameters. Meanwhile, it is easily and readily applicable to predict the prices of other commodities (i.e., stock market).

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第 88 条，共 300 条

标题: Efficient piezocatalytic H(2)O(2 )production of atomic-level thickness Bi4Ti3O12 nanosheets with surface oxygen vacancy

作者: Wang, CY (Wang, Chunyang); Chen, F (Chen, Fang); Hu, C (Hu, Cheng); Ma, TY (Ma, Tianyi); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 431 文献号: 133930 DOI: 10.1016/j.cej.2021.133930 子辑: 1 出版年: MAR 1 2022

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摘要: Traditional anthraquinone method for producing H2O2 needs high energy consumption and substantial toxic by production release. Recently, piezocatalysis that can conquer the above shortcomings emerges as a promising catalytic technique and arouses considerable interests. With rare application of piezocatalysis on H2O2 generation, exploiting efficient tactics for improving piezocatalytic H2O2 productivity is highly anticipated. Herein, atomic-level thickness Bi4Ti3O12 nanosheets with rich surface oxygen vacancies (OVs) are prepared for two-step single-electron O-2 reduction into H2O2 . Piezoelectric force microscopy, piezo-electrochemical tests, and Finite Element Simulation disclose that both the atomic-level thickness and OVs enlarge the piezoelectric coefficient, rendering stronger piezoelectric polarization for accelerating the charge separation and reaction kinetics. Density functional theory calculations uncover that the surface OVs also decrease the adsorption energy of O-2 molecules for facilitating their activation. The ultra-thin Bi4Ti3O12 with optimal OVs content shows a piezocatalytic H2O2 evolution rate of 1611.2 mu mol.h(-1).g(-1) with benign durability. This work delivers a joint-strategy for advancing the piezocatalytic activity, and furnishes a reference for producing useful chemicals by harvesting and utilizing accessible vibrational energy.

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第 89 条，共 300 条

标题: The Research Development of Hedonic Price Model-Based Real Estate Appraisal in the Era of Big Data

作者: Wei, CK (Wei, Cankun); Fu, MC (Fu, Meichen); Wang, L (Wang, Li); Yang, HB (Yang, Hanbing); Tang, F (Tang, Feng); Xiong, YQ (Xiong, Yuqing)

来源出版物: LAND 卷: 11 期: 3 文献号: 334 DOI: 10.3390/land11030334 出版年: MAR 2022

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摘要: In the era of big data, advances in relevant technologies are profoundly impacting the field of real estate appraisal. Many scholars regard the integration of big data technology as an inevitable future trend in the real estate appraisal industry. In this paper, we summarize 124 studies investigating the use of big data technology to optimize real estate appraisal through the hedonic price model (HPM). We also list a variety of big data resources and key methods widely used in the real estate appraisal field. On this basis, the development of real estate appraisal moving forward is analyzed. The results obtained in the current studies are as follows: First, the big data resources currently applied to real estate appraisal include more than a dozen big data types from three data sources; the internet, remote sensing, and the Internet of things (IoT). Additionally, it was determined that web crawler technology represents the most important data acquisition method. Second, methods such as data pre-processing, spatial modeling, Geographic information system (GIS) spatial analysis, and the evolving machine learning methods with higher valuation accuracy were successfully introduced into the HPM due to the features of real estate big data. Finally, although the application of big data has greatly expanded the amount of available data and feature dimensions, this has caused a new problem: uneven data quality. Uneven data quality can reduce the accuracy of appraisal results, and, to date, insufficient attention has been paid to this issue. Future research should pay greater attention to the data integration of multi-source big data and absorb the applications developed in other disciplines. It is also important to combine various methods to form a new united evaluation model based on taking advantage of, and avoiding shortcomings to compensate for, the mechanism defects of a single model.

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第 90 条，共 300 条

标题: The impact of a tear in the subducted Indian plate on the Miocene geology of the Himalayan-Tibetan orogen

作者: Wang, R (Wang, Rui); Weinberg, RF (Weinberg, Roberto F.); Zhu, DC (Di-Cheng Zhu); Hou, ZQ (Zeng-Qian Hou); Yang, ZM (Zhi-Ming Yang)

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摘要: The Yadong-Gulu Rift, cutting across the Gangdese belt and Himalayan terranes, is currently associated with a thermal anomaly in the mantle and crustal melting at 15- 20 km depth. The rift follows the trace of a tear in the underthrusted Indian continental lithospheric slab recognized by high resolution geophysical methods. The Miocene evolution of a 400-km-wide band following the trace of the tear and the rift, records differences interpreted as indicative of a higher heat flow than its surroundings. In the Gangdese belt, this band is characterized by highSr/Y granitic magmatism that lasted 5 m.y. longer than elsewhere and by the highest values of epsilon Hf-(i) and association with the largest porphyry Cu-Mo deposits in the Gangdese belt. Anomalously young magmatic rocks continue south along the rift in the Tethyan and Higher Himalayas. Here, a 300-km-wide belt includes some of the youngest Miocene Himalayan leucogranites; the only occurrence of mantle-derived mafic enclaves in a leucogranite; young mantle-derived lamprophyre dikes; and the youngest and hottest migmatites in the Higher Himalayas. These migmatites record a history of rapid exhumation contemporaneous with the exhumation of Miocene mafic eclogite blocks, which are unique to this region and which were both heated to >800 degrees C at ca. 15-13 Ma, followed by isothermal decompression. We suggest that the prominent tear in the Indian lithosphere, sub-parallel to the rift, is the most likely source for these tectono-thermal anomalies since the Miocene.

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第 91 条，共 300 条

标题: A two-stage DEA evaluation of Chinese mining industry technological innovation efficiency and eco-efficiency

作者: Zuo, ZL (Zuo, Zhili); Guo, HX (Guo, Haixiang); Li, YL (Li, Yonglin); Cheng, JH (Cheng, Jinhua)

来源出版物: ENVIRONMENTAL IMPACT ASSESSMENT REVIEW 卷: 94 文献号: 106762 DOI: 10.1016/j.eiar.2022.106762 提前访问日期: FEB 2022 出版年: MAY 2022

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摘要: Improving technological innovation efficiency and eco-efficiency is the key to achieving a high-quality, sustainable mining industry in China. In order to explore the internal process of technological innovation to promote economic and environmental benefits and to clarify the optimization path to improve the overall efficiency of the mining industry. A two-stage DEA model is used to construct indicators to measure Chinese 30 provinces mining technological innovation efficiency (MTIE), mining eco-efficiency (MEE), and mining comprehensive efficiency (MCE). Because of the lag in innovation, the study period was divided into nine periods from 2008 to 2018 into three-year time slices, and the dynamic evolution of time and space was analyzed. It was found that: (i) MCE and MTIE maintained the same changing trends, with the MCE being generally higher in areas with higher levels of mining economic development; (ii) the MTIE and MEE in the western area were higher than in the other regions, of which Qinghai was the only province that had efficiencies of more than 1 in both stages; (iii) most provinces belonged to type II regions with high MEE-low MTIE or type III regions with low MEE-low MTIE. The scientific achievements output in the first stage was generally insufficient, and the inputs and outputs in the second stage were redundant. There are three paths to optimize efficiency: unilateral optimization, gradual optimization, and jumping optimization. Finally, based on the above findings, policy recommendations are given from three aspects; reducing excess capacity, increasing investment, and building a platform, all of which can provide optimized plans and references for realizing the high-quality development of the Chinese mining industry.

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标题: Molecularly Engineered Covalent Organic Frameworks for Hydrogen Peroxide Photosynthesis

作者: Kou, MP (Kou, Mingpu); Wang, YY (Wang, Yongye); Xu, YX (Xu, Yixue); Ye, LQ (Ye, Liqun); Huang, YP (Huang, Yingping); Jia, BH (Jia, Baohua); Li, H (Li, Hui); Ren, JQ (Ren, Jiaqi); Deng, Y (Deng, Yu); Chen, JH (Chen, Jiahao); Zhou, Y (Zhou, Ying); Lei, K (Lei, Kai); Wang, L (Wang, Li); Liu, W (Liu, Wei); Huang, HW (Huang, Hongwei); Ma, TY (Ma, Tianyi)

来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 61 期: 19 文献号: e202200413 DOI: 10.1002/anie.202200413 提前访问日期: FEB 2022 出版年: MAY 2 2022

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摘要: Synthesizing H2O2 from water and air via a photocatalytic approach is ideal for efficient production of this chemical at small-scale. However, the poor activity and selectivity of the 2 e(-) water oxidation reaction (WOR) greatly restricts the efficiency of photocatalytic H2O2 production. Herein we prepare a bipyridine-based covalent organic framework photocatalyst (denoted as COF-TfpBpy) for H2O2 production from water and air. The solar-to-chemical conversion (SCC) efficiency at 298 K and 333 K is 0.57 % and 1.08 %, respectively, which are higher than the current reported highest value. The resulting H2O2 solution is capable of degrading pollutants. A mechanistic study revealed that the excellent photocatalytic activity of COF-TfpBpy is due to the protonation of bipyridine monomer, which promotes the rate-determining reaction (2 e(-) WOR) and then enhances Yeager-type oxygen adsorption to accelerate 2 e(-) one-step oxygen reduction. This work demonstrates, for the first time, the COF-catalyzed photosynthesis of H2O2 from water and air; and paves the way for wastewater treatment using photocatalytic H2O2 solution.

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标题: The dynamic nexus among financial development, renewable energy and carbon emissions: Moderating roles of globalization and institutional quality across BRI countries

作者: Sheraz, M (Sheraz, Muhammad); Xu, DY (Deyi, Xu); Sinha, A (Sinha, Avik); Mumtaz, MZ (Mumtaz, Muhammad Zubair); Fatima, N (Fatima, Nudrat)

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摘要: Belt and Road (BRI) countries are trying to realize the potential of financial resources and renewable energy in order to mitigate the effects of carbon dioxide (CO2) emissions and to attain the Sustainable Development Goals (SDGs). However, prevailing structural issues have been found to stymie the environmental outcome. This issue calls for a policy reorientation in the BRI countries, and therein lies the role of the present study. This study examines how the environmental impacts of financial development and renewable energy respond to exogenous moderation. Using a second-generation methodological approach on the data of the 64 BRI countries over 2003-2019, findings reveal that globalization enhances the negative environmental externality exerted by financial development, while institutional quality suppresses it. Both globalization and institutional quality augment the positive environmental externalities exerted by renewable energy and human capital. Using dynamic elasticity measures, the evolutionary impacts of the moderators are also captured. An SDG-oriented policy framework is recommended based on the study outcomes.

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标题: Monotone-delay-interval-based Lyapunov functionals for stability analysis of systems with a periodically varying delay

作者: Zeng, HB (Zeng, Hong-Bing); He, Y (He, Yong); Teo, KL (Teo, Kok Lay)

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摘要: This paper focuses on the stability analysis of linear time-invariant (LTI) systems with a time-varying delay. The delay is assumed to be periodically varying. Furthermore, for each period, the delay is divided to be on one monotone increasing interval and one monotone decreasing interval. By capturing the monotone characteristic of the delay intervals, two looped functions are proposed for the monotone increasing intervals and the monotone decreasing intervals, respectively. A novel monotone-delay-interval-based Lyapunov functional is established based on these looped functions. On this basis, less conservative stability conditions are obtained. Finally, a benchmark example is provided to demonstrate the efficiency and the benefits of the proposed approach. (C)& nbsp;2021 Elsevier Ltd. All rights reserved.

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第 95 条，共 300 条

标题: Environmental crises at the Permian-Triassic mass extinction

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摘要: The link between the Permian-Triassic mass extinction (252 million years ago) and the emplacement of the Siberian Traps Large Igneous Province (STLIP) was first proposed in the 1990s. However, the complex cascade of volcanically driven environmental and biological events that led to the largest known extinction remains challenging to reconstruct. In this Review, we critically evaluate the geological evidence and discuss the current hypotheses surrounding the kill mechanisms of the Permian-Triassic mass extinction. The initial extrusive and pyroclastic phase of STLIP volcanism was coeval with a widespread crisis of terrestrial biota and increased stress on marine animal species at high northern latitudes. The terrestrial ecological disturbance probably started 60-370 thousand years before that in the ocean, indicating different response times of terrestrial and marine ecosystems to the Siberian Traps eruptions, and was related to increased seasonality, ozone depletion and acid rain, the effects of which could have lasted more than 1 million years. The mainly intrusive STLIP phase that followed is linked with the final collapse of terrestrial ecosystems and the rapid (around 60 thousand years) extinction of 81-94% of marine species, potentially related to a combination of global warming, anoxia and ocean acidification. Nevertheless, the ultimate reasons for the exceptional severity of the Permian-Triassic mass extinction remain debated. Improved geochronology (especially of terrestrial records and STLIP products), tighter ecological constraints and higher-resolution Earth system modelling are needed to resolve the causal relations between volcanism, environmental perturbations and the patterns of ecosystem collapse.

At the Permian-Triassic boundary (252 million years ago), a series of environmental crises triggered by the Siberian Traps eruptions caused the extinction of 81-94% of marine species and 70% of terrestrial vertebrate families. This Review discusses the relationships between volcanism, environmental perturbations and ecosystem collapse at the Permian-Triassic boundary.

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标题: Knowledge-guided land pattern depiction for urban land use mapping: A case study of Chinese cities

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摘要: Accurate urban land-use maps, which reflect the complicated land-use pattern implied in the function and distribution of land-cover types, play an important role in urban analysis. In recent years, data-driven deep learningbased land-use mapping methods have made great breakthroughs due to their strong feature extraction ability. Meanwhile, multisource geographic data, such as open street map (OSM), has been applied in land-use mapping with high spatial resolution remote sensing (HSR) imagery. Nevertheless, given the intraclass visual inconsistency and interclass label ambiguity, there are enormous challenges in OSM-based land-use pattern depiction: 1) the significant size variability of land-use parcel generated by OSM; 2) the weak interpretability of the datadriven based features; and 3) the neglect of intrinsically hierarchical and nested relationships between landcover and land-use. In this paper, to bridge the "knowledge gap" for urban land-use mapping, a knowledgeguided land pattern depicting (KGLPD) framework is proposed. The proposed KGLPD framework mainly contains four parts. Land-use parcels with various scales are generated based on OSM. An adaptive gradient perceptive (AGP) mechanism is proposed to provide patch distribution prior knowledge for guiding the datadriven based visual feature extraction. To effectively cognize the layout of different land-cover types as the knowledge-driven information, a land pattern cognitive (LPC) model is designed to capture the inner and outer relationships (i.e., direction, distance and co-frequency) of different land-cover types. The fully sparse topic model (FSTM) is then used to extract the critical land pattern information from the data-driven and knowledgedriven information. Four typical Chinese urban cities are selected to evaluate the proposed framework. Experimental results on three cities with four regions of distinctive characteristics in different years, have achieved high classification accuracies of about 80%, with 10% improvement compared with other methods. This demonstrates the effectiveness and robustness of the proposed knowledge-guided urban land use mapping framework. Experimental results on the whole city of Shenzhen in China imply that the proposed framework perform well with small training samples. The results on different cities validate the generalizability and transferability of KGLPD. The typical land-use maps and the corresponding land-cover maps help understanding the relationship between them.

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第 97 条，共 300 条

标题: A comparative study of mutual information-based input variable selection strategies for the displacement prediction of seepage-driven landslides using optimized support vector regression

作者: Ma, JW (Ma, Junwei); Wang, YK (Wang, Yankun); Niu, XX (Niu, Xiaoxu); Jiang, S (Jiang, Sheng); Liu, ZY (Liu, Zhiyang)

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摘要: Artificial intelligence (AI) is becoming increasingly popular and useful for modeling landslide movement processes due to its advantages of providing excellent generalization ability and accurately describing complex and nonlinear behavior. However, the identification of key variables is a crucial step in ensuring robustness and accuracy in AI modeling, but thus far, little attention has been given to this topic. In the present study, mutual information (MI)-based measures are proposed for input variable selection (IVS) and incorporated into optimized support vector regression (SVR) for the displacement prediction of seepage-driven landslides. The performance of optimized SVR models with ten MI-based IVS strategies is compared. A typical seepage-driven landslide was chosen for comparison. The experimental results indicate that IVS-based optimized SVR can significantly improve predictions. When the variable-reduced inputs were input into the optimized artificial bee colony (ABC)-SVR model, the mean values of normalized root mean square error (NRMSE) and Kling-Gupta efficiency (KGE) decreased and increased by as much as 71.6 and 95.2%, respectively, relative to those for the base model with all candidates. Furthermore, the joint mutual information (JMI) and double input symmetrical relevance (DISR) criteria are recommended for IVS for seepage-driven landslides because they achieve the best tradeoff between accuracy and stability.

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第 98 条，共 300 条

标题: A hybrid ensemble-based deep-learning framework for landslide susceptibility mapping

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来源出版物: INTERNATIONAL JOURNAL OF APPLIED EARTH OBSERVATION AND GEOINFORMATION 卷: 108 文献号: 102713 DOI: 10.1016/j.jag.2022.102713 提前访问日期: FEB 2022 出版年: APR 2022

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摘要: Landslides are highly hazardous geological disasters that can potentially threaten the safety of human life and property. As a result, landslide susceptibility mapping (LSM) plays an important role in the landslide prevention system. Recently, many deep learning (DL) models have been adopted for LSM, but they also face problems such as sensitivity to overfitting and lower mapping accuracy. In this paper, a novel hybrid LSM framework is pro-posed based on four heterogeneous ensemble learning (HEL) methods with three single DL models: deep belief network (DBN), convolutional neural network (CNN) and deep residual network (ResNet). The proposed model is tested at the Three Gorges Reservoir area, China. 202 historical landslides and ten conditioning factors were selected to construct a geospatial dataset for LSM. The conditioning factors with high-correlation and low importance were removed from the dataset by using the Spearman Correlation Index and random forests. The geospatial dataset was then divided into two subsets: 70% for training and 30% for testing. Then LSM results was carried out by the single and proposed HEL-based models. The quantitative evaluation of the results showed that the proposed HEL-based models improved the LSM accuracy, and outperformed the single DL LSM models. Stacking model achieved the highest AUC value (0.984), highest Kappa (86.95%), highest overall accuracy (94.17%), highest precision (88.87%), highest Matthews correlation coefficient (87.03%) and highest F1-score (91.34%) among all of models for the testing dataset, while the Boosting model obtained the highest Recall value (96.02%). At the same time, HEL-based models proposed in this study also show better stability and can avoid the overfitting effectively. In addition, the Gini index showed that elevation factor contributes most in LSM in the study area. In general, the proposed framework has promising applicability in improving LSM accuracy.

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标题: Bi-CLKT: Bi-Graph Contrastive Learning based Knowledge Tracing

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摘要: The goal of Knowledge Tracing (KT) is to estimate how well students have mastered a concept based on their historical learning of related exercises. The benefit of knowledge tracing is that students' learning plans can be better organised and adjusted, and interventions can be made when necessary. With the recent rise of deep learning, Deep Knowledge Tracing (DKT) has utilised Recurrent Neural Networks (RNNs) to accomplish this task with some success. Other works have attempted to introduce Graph Neural Networks (GNNs) and redefine the task accordingly to achieve significant improvements. However, these efforts suffer from at least one of the following drawbacks: (1) they pay too much attention to details of the nodes rather than to high-level semantic information; (2) they struggle to effectively establish spatial associations and complex structures of the nodes; and (3) they represent either concepts or exercises only, without integrating them. Inspired by recent advances in self-supervised learning, we propose a Bi-Graph Contrastive Learning based Knowledge Tracing (Bi-CLKT) to address these limitations. Specifically, we design a two-layer comparative learning scheme based on an "exercise-to-exercise "(E2E) relational subgraph. It involves node-level contrastive learning of subgraphs to obtain discriminative representations of exercises, and graph-level contrastive learning to obtain discriminative representations of concepts. Moreover, we designed a joint contrastive loss to obtain better representations and hence better prediction performance. Also, we explored two different variants, using RNN and memory-augmented neural networks as the prediction layer for comparison to obtain better representations of exercises and concepts respectively. Extensive experiments on four real-world datasets show that the proposed Bi-CLKT and its variants outperform other baseline models. (c) 2022 Elsevier B.V. All rights reserved.

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第 100 条，共 300 条

标题: A comparative study of different machine learning methods for reservoir landslide displacement prediction

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来源出版物: ENGINEERING GEOLOGY 卷: 298 文献号: 106544 DOI: 10.1016/j.enggeo.2022.106544 提前访问日期: FEB 2022 出版年: MAR 5 2022

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摘要: ABSTR A C T This paper compares the performance of five popular machine learning methods, namely, particle swarm opti-mization-extreme learning machine (PSO-ELM), particle swarm optimization-kernel extreme learning machine (PSO-KELM), particle swarm optimization-support vector machine (PSO-SVM), particle swarm opti-mization-least squares support vector machine (PSO-LSSVM), and long short-term memory neural network (LSTM), in the prediction of reservoir landslide displacement. The Baishuihe, Shuping, and Baijiabao landslides in the Three Gorges reservoir area of China were used for case studies. Cumulative displacement was decom-posed into trend displacement and periodic displacement by the Hodrick-Prescott filter. The double exponential smoothing method and the five machine learning methods were used to predict the trend and periodic displacement, respectively. The five machine learning methods are compared in three aspects: highest single prediction accuracy, mean prediction accuracy, and prediction stability. The results show that no method per -formed the best for all three aspects in the three landslide cases. LSTM and PSO-ELM achieved better single prediction accuracy, but worse mean prediction accuracy and stability. PSO-KELM, PSO-LSSVM, and PSO-SVM always yielded consistent predictions with slight variations. On the whole, PSO-KELM and PSO-LSSVM are recommended for their superior mean prediction accuracy and prediction stability.

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第 101 条，共 300 条

标题: Desulfurivibrio spp. mediate sulfur-oxidation coupled to Sb(V) reduction, a novel biogeochemical process

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摘要: Antimony (Sb) contamination released from mine tailings represents a global threat to natural ecosystems and human health. The geochemical conditions of Sb tailings, which are oligotrophic and replete in sulfur (S) and Sb, may promote the coupled metabolism of Sb and S. In this study, multiple lines of evidence indicate that a novel biogeochemical process, S oxidation coupled to Sb(V) reduction, is enzymatically mediated by Desulfurivibrio spp. The distribution of Desulfurivibrio covaried with S and Sb concentrations, showing a high relative abundance in Sb mine tailings but not in samples from surrounding sites (i.e., soils, paddies, and river sediments). Further, the metabolic potential to couple S oxidation to Sb(V) reduction, encoded by a non-canonical, oxidative sulfite reductase (dsr) and arsenate reductase (arrA) or antimonate reductase (anrA), respectively, was found to be common in Desulfurivibrio genomes retrieved from metal-contaminated sites in southern China. Elucidation of enzymatically-catalyzed S oxidation coupled to Sb(V) reduction expands the fundamental understanding of Sb biogeochemical cycling, which may be harnessed to improve remediation strategies for Sb mine tailings.

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标题: Identification of Favorable Zones of Gas Accumulation via Fault Distribution and Sedimentary Facies: Insights From Hangjinqi Area, Northern Ordos Basin

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摘要: The Hangjinqi area was explored for natural gas around 40 years ago, but the efficient consideration in this area was started around a decade ago for pure gas exploration. Many wells have been drilled, yet the Hangjinqi area remains an exploration area, and the potential zones are still unclear. The Lower Shihezi Formation is a proven reservoir in the northern Ordos Basin. This study focuses on the second and third members of the Lower Shihezi Formation to understand the controlling factors of faults and sedimentary facies distribution, aimed to identify the favorable zones of gas accumulation within the Hangjinqi area. The research is conducted on a regional level by incorporating the 3D seismic grid of about 2500 km(2), 62 well logs, and several cores using seismic stratigraphy, geological modeling, seismic attribute analysis, and well logging for the delineation of gas accumulation zones. The integrated results of structural maps, thickness maps, sand-ratio maps, and root mean square map showed that the northwestern region was uplifted compared to the southern part. The natural gas accumulated in southern zones was migrated through Porjianghaizi fault toward the northern region. Well J45 from the north zone and J77 from the south zone were chosen to compare the favorable zones of pure gas accumulation, proving that J45 lies in the pure gas zone compared to J77. Based on the faults and sedimentary facies distribution research, we suggest that the favorable zones of gas accumulation lie toward the northern region within the Hangjinqi area.

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标题: Characteristics of methane adsorption/desorption heat and energy with respect to coal rank

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摘要: Changes of heat and energy during methane adsorption and desorption are essential factors affecting the pro-duction of coalbed methane. To characterize adsorption and desorption behaviors, low-temperature nitrogen adsorption experiments and methane isothermal adsorption/desorption experiments were carried out on coals with different rank. The Brunauer-Emmett-Teller (BET) specific surface area (SSA) of the coal samples studied range from 0.29 m2 g(-1)to 2.31 m2 g(-1), and Barrett-Joyner-Halenda (BJH) pore volume ranges from 0.95 x 10(-3) cm(3 )g(-1) to 6.14 x 10(-3 )cm(3) g(-1). It is observed that the BET SSA and BJH pore volume decrease first and then increase with the increase of coal rank. The isometric heat in the adsorption process is less than that in the desorption process. There is an energy difference between adsorption and desorption, which makes the sorption process irreversible. The larger the Langmuir volume, the higher the adsorption capacity, making the external energy required for the adsorption process smaller and the limit isosteric heat more minor. At different tem-peratures, the Gibbs free energy of samples BD-1, LL-1 and HC-(-1) changes between 2.26-2.98 kJ mol(-1), 2.05-3.24 kJ mol-1 and 1.91-3.08 kJ mol(-1), respectively, indicating that the process of methane desorption on coal is a spontaneous reaction. The cumulative reduction of surface free energy (delta gamma) and the reduction of surface free energy at each pressure point (delta gamma rho) show that the adsorption capacity of the low-and medium-rank coal are more easily affected by temperature, while that of the high-rank coal is less affected by temperature. Moreover, the smaller the BET SSA, the greater & UDelta;gamma and & UDelta;gamma p.

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标题: Uncoupled multivariate power models for estimating performance-based seismic damage states of column curvature ductility

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摘要: The assessment for the thresholds of different damage state plays a vital role in the performance-based seismic design of earthquake-resistant structures. Although fast evaluation for limit curvature of slight damage (DS1) is presented in specifications and literature, quantitative models for other damage states, i.e. moderate damage (DS2), extensive damage (DS3), and collapse damage (DS4) curvature are not clearly illustrated. Therefore, an uncoupled multivariate power model (UCMV-PM), i.e., multivariate logarithm linearity models is proposed to estimate the curvature ductility of four damage states of column sections by considering the effects of four factors (section dimensional (L): 1 to 3 m, volumetric percentage of the reinforcement (rho l): (0.01 to 0.03), transverse volumetric steel ratio(rho s): (0.01 to 0.03), axial compression ratio (Rac): 0.1 to 0.3). To obtain large sample data, a simplified parametric calculation procedure for moment-curvature (M-phi) curves and each damage state is proposed. Based on the efficient procedure, a sample space of 214 data with four factors and 21 levels is quickly established on a common desktop computer. Finally, verification, comparison, and application of UCMV-PM indicate its characteristics of high accuracy, strong practicability, and wide coverage.

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标题: Land-Use/Land-Cover change detection based on a Siamese global learning framework for high spatial resolution remote sensing imagery

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摘要: Due to the abundant features of high spatial resolution (HSR) remote sensing images, change detection of these images is crucial to understanding the land-use and land-cover (LULC) changes. However, previous works mostly focus on traditional binary change detection without considering the semantic information of the change classes. The latest progress of deep learning (DL) shows its advantages in HSR remote sensing images change detection. However, due to the large number of parameter calculations, the DL network always requires a large quantity of labeled data. In addition, DL methods for change detection usually follow a patch-based learning framework, which considers only the local area and leads to a sample imbalance problem for semantic change detection. To address the above issues, we first proposed a Siamese global learning (Siam-GL) framework, which is a novel semantic change detction framework for HSR remote sensing images. In Siam-GL, the Siamese architecture with shared parameters is constructed to effectively extract the representative features of bi-temporal HSR remote sensing images. The global hierarchical (G-H) sampling mechanism is designed to address the imbalanced training sample problem with insufficient samples. Furthermore, the binary change mask is added between the encoder and decoder to weaken the influence of the no-change regional background on the change regional foreground, further improving the accuracy of the proposed framework. The experimental results obtained with three diverse HSR datasets of typical Chinese cities demonstrated that the Siam-GL framework outperforms the advanced semantic change detection methods in terms of both quantity and quality. Moreover, to verify the generalization performance of the Siam-GL framework, a larger dataset was used for evaluation, and the results show that the Siam-GL framework has strong generalization performance.

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标题: Sedimentary Facies Controls for Reservoir Quality Prediction of Lower Shihezi Member-1 of the Hangjinqi Area, Ordos Basin

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被引频次合计: 26

摘要: The tight gas reserves in the Hangjinqi area are estimated at 700 x 109 m(3). Since the exploration of the Hangjinqi, numerous wells are already drilled. However, the Hangjinqi remains an exploration area and has yet to become a gas field. Identifying a paleo-depositional framework such as braided channels is beneficial for exploration and production companies. Further, braided channels pose drilling risks and must be properly identified prior to drilling. Henceforth, based on the significance of paleochannels, this study is focused on addressing the depositional framework and sedimentary facies of the first member (P(2)x(1)) of the lower Shihezi formation (LSF) for reservoir quality prediction. Geological modeling, seismic attributes, and petrophysical modeling using cores, logs, interval velocities, and 3D seismic data are employed. Geological modeling is conducted through structural maps, thickness map, and sand-ratio map, which show that the northeastern region is uplifted compared to northwestern and southern regions. The sand-ratio map showed that sand is accumulated in most of the regions within member-1. Interval velocities are incorporated to calibrate the acoustic impedance differences of mudstone and sandstone lithologies, suggesting that amplitude reflection is reliable and amplitude-dependent seismic attributes can be employed. The Root Mean Square (RMS) attribute confirmed the presence of thick-bedded braided channels. The results of cores and logging also confirmed the presence of braided channels and channel-bars. The test results of wells J34 and J72 shows that the reservoir quality within member-1 of LSF is favorable for gas production within the Hangjinqi area.

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第 107 条，共 300 条

标题: Impacts of Drought and Climatic Factors on Vegetation Dynamics in the Yellow River Basin and Yangtze River Basin, China

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来源出版物: REMOTE SENSING 卷: 14 期: 4 文献号: 930 DOI: 10.3390/rs14040930 出版年: FEB 2022

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摘要: Understanding the impacts of drought and climate change on vegetation dynamics is of great significance in terms of formulating vegetation management strategies and predicting future vegetation growth. In this study, Pearson correlation analysis was used to investigate the correlations between drought, climatic factors and vegetation conditions, and linear regression analysis was adopted to investigate the time-lag and time-accumulation effects of climatic factors on vegetation coverage based on the standardized evapotranspiration deficit index (SEDI), normalized difference vegetation index (NDVI), and gridded meteorological dataset in the Yellow River Basin (YLRB) and Yangtze River Basin (YTRB), China. The results showed that (1) the SEDI in the YLRB showed no significant change over time and space during the growing season from 1982 to 2015, whereas it increased significantly in the YTRB (slope = 0.013/year, p < 0.01), and more than 40% of the area showed a significant trend of wetness. The NDVI of the two basins, YLRB and YTRB, increased significantly at rate of 0.011/decade and 0.016/decade, respectively (p < 0.01). (2) Drought had a significant impact on vegetation in 49% of the YLRB area, which was mainly located in the northern region. In the YTRB, the area significantly affected by drought accounted for 21% of the total area, which was mainly distributed in the Sichuan Basin. (3) In the YLRB, both temperature and precipitation generally had a one-month accumulated effect on vegetation conditions, while in the YTRB, temperature was the major factor leading to changes in vegetation. In most of the area of the YTRB, the effect of temperature on vegetation was also a one-month accumulated effect, but there was no time effect in the Sichuan Basin. Considering the time effects, the contribution of climatic factors to vegetation change in the YLRB and YTRB was 76.7% and 63.2%, respectively. The explanatory power of different vegetation types in the two basins both increased by 2% to 6%. The time-accumulation effect of climatic factors had a stronger explanatory power for vegetation growth than the time-lag effect.

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第 108 条，共 300 条

标题: DeFusionNET: Defocus Blur Detection via Recurrently Fusing and Refining Discriminative Multi-Scale Deep Features

作者: Tang, C (Tang, Chang); Liu, XW (Liu, Xinwang); Zheng, X (Zheng, Xiao); Li, WQ (Li, Wanqing); Xiong, J (Xiong, Jian); Wang, LZ (Wang, Lizhe); Zomaya, A (Zomaya, Albert); Longo, A (Longo, Antonella)

来源出版物: IEEE TRANSACTIONS ON PATTERN ANALYSIS AND MACHINE INTELLIGENCE 卷: 44 期: 2 页: 955-968 DOI: 10.1109/TPAMI.2020.3014629 出版年: FEB 1 2022

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摘要: Albeit great success has been achieved in image defocus blur detection, there are still several unsolved challenges, e.g., interference of background clutter, scale sensitivity and missing boundary details of blur regions. To deal with these issues, we propose a deep neural network which recurrently fuses and refines multi-scale deep features (DeFusionNet) for defocus blur detection. We first fuse the features from different layers of FCN as shallow features and semantic features, respectively. Then, the fused shallow features are propagated to deep layers for refining the details of detected defocus blur regions, and the fused semantic features are propagated to shallow layers to assist in better locating blur regions. The fusion and refinement are carried out recurrently. In order to narrow the gap between low-level and high-level features, we embed a feature adaptation module before feature propagating to exploit the complementary information as well as reduce the contradictory response of different feature layers. Since different feature channels are with different extents of discrimination for detecting blur regions, we design a channel attention module to select discriminative features for feature refinement. Finally, the output of each layer at last recurrent step are fused to obtain the final result. We collect a new dataset consists of various challenging images and their pixel-wise annotations for promoting further study. Extensive experiments on two commonly used datasets and our newly collected one are conducted to demonstrate both the efficacy and efficiency of DeFusionNet.

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输出日期: 2023-09-04

第 109 条，共 300 条

标题: Geothermal Energy Exploitation and Power Generation via a Single Vertical Well Combined with Hydraulic Fracturing

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来源出版物: JOURNAL OF ENERGY ENGINEERING 卷: 148 期: 1 文献号: 04021058 DOI: 10.1061/(ASCE)EY.1943-7897.0000809 出版年: FEB 1 2022

Web of Science 核心合集中的 "被引频次": 22

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摘要: A method of single vertical well combined with hydraulic fracturing is proposed to prevent short circuits and enhance heat mining. The technical and economic feasibilities of geothermal energy exploitation from a deep reservoir are analyzed based on this method. A simulation model was established to analyze the coupled heat transfer between wellbore and reservoir, and then thermodynamic performances and economic analyses of single-flash, double-flash, and flash-organic Rankine cycle geothermal power generation systems were carried out. Simulation results indicate that the heat mining rate can maintain above 3 MW after 40 years of exploitation from the reservoir with 235 degrees C using a water circulation rate of 432 m(3)/day. A combination of large horizontal permeability, high circulation flow rate, and excellent thermal-insulating tubings favors high heat mining. Thermodynamic cycle analyses show that the net power outputs from the single-flash, double-flash, and flash-organic Rankine cycle systems under the optimal condition are 513, 646, and 627.8 kW, respectively. Correspondingly, the geothermal power generation cost ranges from S0.086/kWh to $0.095/kWh, which is a little higher than the conventional power generation cost. Double-flash or flash-organic Rankine cycle is suggested to be installed for geothermal power generation if more electricity is needed. (C) 2021 American Society of Civil Engineers.

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第 110 条，共 300 条

标题: Emerging S-Scheme Photocatalyst

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来源出版物: ADVANCED MATERIALS 卷: 34 期: 11 文献号: 2107668 DOI: 10.1002/adma.202107668 提前访问日期: JAN 2022 出版年: MAR 2022

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摘要: Photocatalysis is a green technology to use ubiquitous and intermittent sunlight. The emerging S-scheme heterojunction has demonstrated its superiority in photocatalysis. This article covers the state-of-the-art progress and provides new insights into its general designing criteria. It starts with the challenges confronted by single photocatalyst from the perspective of energy dissipation by borrowing the common behaviors in the dye molecule. Subsequently, other problems faced by single photocatalyst are summarized. Then a viable solution for these problems is the construction of heterojunctions. To overcome the problems and mistakes of type-II and Z-scheme heterojunctions, S-scheme heterojunction is proposed and the underlying reaction mechanism is summarized. Afterward, the design principles for S-scheme heterojunction are proposed and four types of S-scheme heterojunctions are suggested. Following this, direct characterization techniques for testifying the charge transfer in S-scheme heterojunction are presented. Finally, different photocatalytic applications of S-scheme heterojunctions are summarized. Specifically, this work endeavors to clarify the critical understanding on curved Fermi level in S-scheme heterojunction interface, which can help strengthen and advance the fundamental theories of photocatalysis. Moreover, the current challenges and prospects of the S-scheme heterojunction photocatalyst are critically discussed.

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第 111 条，共 300 条

标题: Sandwich-Shell Structured CoMn2O4/C Hollow Nanospheres for Performance-Enhanced Sodium-Ion Hybrid Supercapacitor

作者: Ma, Y (Ma, Yang); Zhang, LY (Zhang, Liuyang); Yan, ZX (Yan, Zhaoxiong); Cheng, B (Cheng, Bei); Yu, JG (Yu, Jiaguo); Liu, T (Liu, Tao)

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摘要: Sodium hybrid supercapacitors (Na-HSCs) are regarded as one promising electrochemical energy storage device, because of the low price of sodium, prolonged life cycle, and high-energy/power density. Nonetheless, the imparity between the fast capacitive reactions at cathode and the sluggish Faradaic reactions at the anode leads to an imbalance in the electrochemical reaction kinetics, limiting the development of Na-HSCs. Therefore, it is urgent to develop suitable anode materials for performance-enhanced Na-HSCs. Herein, sandwich-shell-structured CoMn2O4/C hollow spheres are synthesized by a facile hydrothermal reaction and subsequent calcination, where mesoporous carbon hollow spheres (CHSs) serve as nonsacrificial hard templates. CHSs with numerous mesoporous channels are beneficial for the penetration of reactant ions. Therefore, CoMn2O4 nanosheets are successfully deposited on the inner and outer surfaces of CHSs, generating sandwich-shell-structured CoMn2O4/C hollow spheres. Benefiting from the unique design, CoMn2O4/C HSs exhibit excellent sodium storage performance, including a high-specific capacity of 290 mAh g(-1) at 0.1 A g(-1) and prolonged cycling durability. A Na-HSC assembled by CoMn2O4/C HSs anode and activated carbon cathode exhibits a high-energy density (265 Wh kg(-1)) and a wide-operating voltage range (0.01-4.0 V).

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第 112 条，共 300 条

标题: Spatiotemporal evolution of ecological vulnerability in the Yellow River Basin under ecological restoration initiatives

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摘要: Drought, water shortage, and anthropogenic disturbance bring about serious ecological issues in the Yellow River Basin. In recent decades, the "Grain-for-Green" project, wind-sand control, and water ecological civilization construction are major events affecting the ecological vulnerability in the Yellow River Basin. Based on the "exposure-sensitivity-adaptability" framework and earth observation data, this study proposes an ecological vulnerability evaluation index system that reflects the impacts of natural and human stressors and assesses the ecological vulnerability in the Yellow River Basin during different policy periods. The results show that the overall ecological vulnerability level shows a decreasing trend from 2001 to 2019 in the Yellow River Basin, despite a slight increase in 2015 due to the impact of the dry climate. Medium ecological vulnerability level prevails in the Yellow River Basin. The vulnerability levels have obvious geographical spatial variation. The northern areas in the upper reaches are most vulnerable. Ecological vulnerability in the midstream is better than that in downstream. Ecological restoration policies had an overall positive influence on ecological vulnerability improvement. From 2001 to 2010, the percentages of Heavy (0.60-0.70) and Very heavy (>= 0.70) ecological vulnerability areas in upstream and midstream decreased by 13.3 % under the impact of priority forestry projects. The findings provide guidance for ecological restoration in the Yellow River Basin and the outlined approach is potentially transferable to assess the ecological vulnerability in other regions.

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第 113 条，共 300 条

标题: Energy endowment, environmental regulation, and energy efficiency: Evidence from China

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来源出版物: TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 卷: 177 文献号: 121528 DOI: 10.1016/j.techfore.2022.121528 提前访问日期: JAN 2022 出版年: APR 2022

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摘要: Achieving carbon neutrality requires low-carbon energy transformation and further a pronounced enhancement of energy efficiency and environmental regulation. However, the impact of energy endowment on energy efficiency and the moderating effects of various environmental regulations have not yet been studied in an integrated framework. This paper aims to address this knowledge gap by employing a system generalized method of moments (system GMM) for China with panel data of 30 provincial regions from 2008 to 2018. The results reveal varying energy efficiency among different provincial regions in China at a medium-to-low level and confirm the existence of resource curse at the national level since the impact of energy endowment on energy efficiency is significantly negative. Whereas market-based environmental regulations had a significantly positive moderating effect on the relationship between energy endowment and energy efficiency, this effect was insignificant for command-and-control environmental regulations. These findings provide empirical evidence to support the formulation of environmental regulations that will further improve energy efficiency and carbon neutrality in China.

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第 114 条，共 300 条

标题: Two colorimetric films based on chitin whiskers and sodium alginate/ gelatin incorporated with anthocyanins for monitoring food freshness

作者: Zheng, YW (Zheng, Yuewei); Li, XM (Li, Xiaomin); Huang, Y (Huang, Yao); Li, HB (Li, Houbin); Chen, LY (Chen, Lingyun); Liu, XH (Liu, Xinghai)

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Web of Science 核心合集中的 "被引频次": 33

被引频次合计: 33

摘要: Intelligent food packaging materials from natural resources has attracted increasing attention nowadays. In this paper, two fresh colorimetric films were obtained by incorporating natural pigment anthocyanins extract (LRM) as pH-sensitive pigments into two polyelectrolyte complex films composed of chitin whiskers (CW) and sodium alginate (SA)/gelatin (GE), respectively. The analysis results of FTIR, SEM and DSC show that, compared with the single polysaccharide system of SA or GE, the composite film with addition of CW has better water resistance and thermal stability, due to the existence of hydrogen bonds and electrostatic interactions. Meanwhile, the adhesion to LRM is also enhanced. At the same time, through Ritger-Peppas kinetic model analysis, the release process of anthocyanins in the two film systems was analyzed. The CW/SA/LRM system membrane showed good responsiveness to lactic acid and was successfully used in the detection of milk freshness; while the CW/GE/LRM system membrane showed good responsiveness to amine gases and has been successfully used in the detection of pork freshness. The study revealed that the above colorimetric films demonstrate excellent durability and accuracy in food freshness monitoring.

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第 115 条，共 300 条

标题: Terrain gradient variations in the ecosystem services value of the Qinghai-Tibet Plateau, China

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来源出版物: GLOBAL ECOLOGY AND CONSERVATION 卷: 34 文献号: e02008 DOI: 10.1016/j.gecco.2022.e02008 提前访问日期: JAN 2022 出版年: APR 2022

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摘要: The Qinghai-Tibet Plateau is an important ecological function area in the world, but its ecosystem is very fragile owing to the alpine environment. Owing to varying landforms exhibiting significant spatial differences in terms of temperature, light, soil and water conservation capacity, topography largely determines the spatial distribution of ecosystem services in areas with complex natural conditions. Studying the impact of topography on ecosystem services is important for efficient land use and ecosystem management. However, the effects of topography on ecosystem services have rarely been studied in the Qinghai-Tibet Plateau. In this study, using land use data from 1980, 1990, 2000, 2010, and 2020, the ecosystem services value (ESV) of the Qinghai-Tibet Plateau was estimated, and its spatiotemporal variation characteristics were analyzed using the ESV equivalent factor method. Spatial autocorrelation was introduced to analyze the spatial dependency between ecosystem services and topography. The results showed that the ESV of the Qinghai-Tibet Plateau decreased from $1,700,028 million in 1980 to $1,656,0 38 million in 1990 and then steadily increased to $1,678,294 million in 2020. Moreover, the spatial distribution of the average ESV was mainly characterized by high values in the southeast region and low values in the northwest region. The ESV exhibited different geographical distributions and temporal variation characteristics across the topographic gradient, and a significant spatial dependence was observed between the average ESV and topography. Hence, priority should be given to the ecological protection of high-altitude areas, such as high mountain valley regions of the plateau.

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第 116 条，共 300 条

标题: Emerging frontiers of Z-scheme photocatalyric systems

作者: Liao, GF (Liao, Guangfu); Li, CX (Li, Chunxue); Liu, SY (Liu, Shi-Yong); Fang, BZ (Fang, Baizeng); Yang, HM (Yang, Huaming)

来源出版物: TRENDS IN CHEMISTRY 卷: 4 期: 2 页: 111-127 DOI: 10.1016/j.trechm.2021.11.005 提前访问日期: JAN 2022 出版年: FEB 2022

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摘要: Z-scheme photocatalysts have recently received tremendous attention because of their strong light utilization and redox ability. This cutting-edge photocatalytic platform allows photocatalysts to convert light into chemical energy with high activity, selectivity, and stability. In this review, we highlight some of the recent key contributions in the field, including fundamental principles, advanced characterization methods, and a series of photocatalytic applications (e.g., water splitting, CO2 reduction, N-2 fixation, H2O2 production). Significant improvement strategies for Z-scheme photocatalysts are also discussed and summarized. With increasing achievements, Z-scheme photocatalytic systems (PSs) will make a historic breakthrough in activity, solar utilization, selectivity, and fabrication cost and move toward practical production in the near future.

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ESI 热点论文: N

输出日期: 2023-09-04

第 117 条，共 300 条

标题: Numerical analysis of the cyclic loading behavior of monopile and hybrid pile foundation

作者: Li, LC (Li, Lichen); Zheng, MY (Zheng, Mingyan); Liu, X (Liu, Xin); Wu, WB (Wu, Wenbing); Liu, H (Liu, Hao); El Naggar, MH (El Naggar, M. Hesham); Jiang, GS (Jiang, Guosheng)

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被引频次合计: 39

摘要: The idea of hybrid pile foundation provides optimized foundation solutions for the new generation of offshore wind turbines (OWTs). In this paper, the behavior of monopile and hybrid pile foundation under cyclic lateral load is studied based on three-dimensional coupled discrete continuum modelling. The soil sample is simulated as an aggregation of discrete particles while the pile foundation is constructed as continuum material. The influence of pile stiffness and hybrid foundation type is considered. Numerical results indicate that the increase of pile stiffness and the application of hybrid pile foundation could improve the secant stiffness and reduce the accumulated lateral displacement of the pile foundation. The additional footing and bucket could improve the efficiency of soil resistance mobilization at shallow soil. Under cyclic loading, soil particles tend to move towards the foundation, leading to the formation of convective zones. The size of the convective zone is influenced by the displacement pattern and displacement magnitude of the foundation. As for the soil plug inside the pile, it could be assumed as additional mass that displaces simultaneously with the pile foundation. The numerical research could provide some new perspectives for the interaction between hybrid pile foundation and surrounding soil under cyclic lateral loading condition.

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第 118 条，共 300 条

标题: Potentially toxic elements in cascade dams-influenced river originated from Tibetan Plateau

作者: Zeng, J (Zeng, Jie); Han, GL (Han, Guilin); Zhang, ST (Zhang, Shitong); Liang, B (Liang, Bin); Qu, R (Qu, Rui); Liu, M (Liu, Man); Liu, JK (Liu, Jinke)

来源出版物: ENVIRONMENTAL RESEARCH 卷: 208 文献号: 112716 DOI: 10.1016/j.envres.2022.112716 提前访问日期: JAN 2022 出版年: MAY 15 2022

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被引频次合计: 45

摘要: Rivers originated from Tibetan Plateau are of great significance due to their environmental sensibility and fragility. However, the pollution of suspended particulate matter (SPM) in these rivers is rarely reported, in particular, the potentially toxic elements (PTEs) contamination. To clarify the status, sources, behavior, and risks of PTEs in SPM, a full investigation was conducted in dams-influenced Lancangjiang River basin. The findings revealed that the PTEs content (mg kg-1) ranked Mn (766) > V (151.7) > Zn (131.0) > Cr (94.6) > Ni (44.2) > Pb (36.7) > Cu (29.4) > Co (14.6) > Sb (2.6) > Mo (1.6) > Tl (0.78) > Cd (0.48). The multi-index assessment suggested that Sb and Cd were moderately severe to severe enriched PTEs with the enrichment factor values of 10.0 and 8.8 and the geo-accumulation index values of 2.2 and 2.0, respectively, while the rest of PTEs were minor/no enrichment. In contrast, Cr and Ni were major toxic elements in SPM which contributed 25 +/- 10%, 24 +/- 8% to the total toxic risk index. The high partition coefficients (e.g., 6.1 for Cr) were observed in most PTEs and resulted in the 96.3% of Cr, 85.2% of Zn, 83.6% of Pb, 77.8% of Ni, and 63.2% of Cu transportation in the SPM form. Natural inputs (e.g., soil erosion) are the main source (53.6%-61.9%) of V, Cr, Mn, Co, Ni, and Tl, while fuel burning contributed 40.9% of Zn, 32.5% of Pb, and 37.3% of Cd. Moreover, 51.2% of Sb was attributed to industrial waste source, while porphyry copper/molybdenum deposits related milltailings were the co-source of Mo (54.4%) and Cu (34.8%). Overall, the PTEs geochemistry of SPM showed the potential in tracing regional environmental change.

入藏号: WOS:000751882800002

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第 119 条，共 300 条

标题: How to Obtain Anti-Thermal-Quenching Inorganic Luminescent Materials for Light-Emitting Diode Applications

作者: Dang, PP (Dang, Peipei); Wang, W (Wang, Wei); Lian, HZ (Lian, Hongzhou); Li, GG (Li, Guogang); Lin, J (Lin, Jun)

来源出版物: ADVANCED OPTICAL MATERIALS 卷: 10 期: 6 文献号: 2102287 DOI: 10.1002/adom.202102287 提前访问日期: JAN 2022 出版年: MAR 2022

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摘要: Phosphor-converted light-emitting diode (pc-LED) has drawn much interest due to the efficient light in solid-state lighting, backlight display, security, and electronic devices. Thermal quenching (TQ) induced by nonradiative relaxation is one of the vital challenges that limits the widespread use of phosphors. Much efforts are devoted to designing different approaches to solve the emission loss at increasing temperature. Here, the mechanism of TQ and recent advances of anti-TQ-phosphor-involved 5d-4f, 4f-4f, 6p-6s, 3d-3d transitions are discussed. Several important design strategies for anti-TQ phosphors are summarized as follows: 1) defect engineering; 2) energy transfer; 3) structural modulation; 4) enhancing crystallinity; 5) layer structural design; 6) negative/zero thermal expansion; 7) surface coating and glass technology. Additionally, some future challenges and opportunities in this field are proposed. This review promotes the discovery of novel anti-TQ phosphor materials for LED applications.

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第 120 条，共 300 条

标题: Resource Allocation in IoT Edge Computing via Concurrent Federated Reinforcement Learning

作者: Zhu, TQ (Tianqing Zhu); Zhou, W (Zhou, Wei); Ye, DY (Ye, Dayong); Cheng, ZS (Cheng, Zishuo); Li, J (Li, Jin)

来源出版物: IEEE INTERNET OF THINGS JOURNAL 卷: 9 期: 2 页: 1414-1426 DOI: 10.1109/JIOT.2021.3086910 出版年: JAN 15 2022

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摘要: Resource allocation is a fundamental research issue in IoT edge computing, and reinforcement learning is fast becoming a common solution. The majority of the current techniques involve decision makers who determine how and where resources should be distributed. In a standard cloud system, this decision maker is a central server. In an edge system, the decision maker is an edge host. Both approaches have drawbacks. Edge hosts do not always have access to enough global information to create the most optimal resource allocation strategy. Central servers do but at the cost of privacy. A solution is needed that can do both. This article, therefore, presents a novel resource allocation method called concurrent federated reinforcement learning. The scheme inherits the privacy protection of federated learning, the complex problem solving power of reinforcement learning and adds concurrency in the form of joint decision making so the resource allocation strategies work to the benefit of the global system. The experiments demonstrate that the approach provides the state-of-the-art performance in system-wide utility, speed of task completion, and resource utilization.

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第 121 条，共 300 条

标题: EDOT-based conjugated polymers accessed via C-H direct arylation for efficient photocatalytic hydrogen production

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来源出版物: CHEMICAL SCIENCE 卷: 13 期: 6 页: 1725-1733 DOI: 10.1039/d1sc05784g 提前访问日期: JAN 2022 出版年: FEB 9 2022

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摘要: 3,4-Ethylene dioxythiophene (EDOT), as a monomer of commercial conductive poly(3,4-ethylene dioxythiophene) (PEDOT), has been facilely incorporated into a series of new pi-conjugated polymer-based photocatalysts, i.e., BSO2-EDOT, DBT-EDOT, Py-EDOT and DFB-EDOT, through atom-economic C-H direct arylation polymerization (DArP). The photocatalytic hydrogen production (PHP) test shows that donor-acceptor (D-A)-type BSO2-EDOT renders the highest hydrogen evolution rate (HER) among the linear conjugated polymers (CPs) ever reported. A HER up to 0.95 mmol h(-1)/6 mg under visible light irradiation and an unprecedented apparent quantum yield of 13.6% at 550 nm are successfully achieved. Note that the photocatalytic activities of the C-H/C-Br coupling-derived EDOT-based CPs are superior to those of their counterparts derived from the classical C-Sn/C-Br Stille coupling, demonstrating that EDOT is a promising electron-rich building block which can be facilely integrated into CP-based photocatalysts. Systematic studies reveal that the enhanced water wettability by the integration of polar BSO2 with hydrophilic EDOT, the increased electron-donating ability by O-C p-pi conjugation, the improved electron transfer by D-A architecture, broad light harvesting, and the nano-sized colloidal character in a H2O/NMP mixed solvent rendered BSO2-EDOT as one of the best CP photocatalysts toward PHP.

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第 122 条，共 300 条

标题: Tax rebates, technological innovation and sustainable development: Evidence from Chinese micro-level data

作者: Zhang, YJ (Zhang, Yijun); Song, Y (Song, Yi)

来源出版物: TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 卷: 176 文献号: 121481 DOI: 10.1016/j.techfore.2022.121481 提前访问日期: JAN 2022 出版年: MAR 2022

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摘要: Promoting coordinated economic and environmental development is an important problem faced by all countries. Based on an unbalanced panel dataset of Chinese mining firms from 2008 to 2011, this article investigates the impact of tax rebates for energy conservation and environmental protection on enterprise economic and environmental performance, and explores the mechanism involved. The results show that: (1) tax rebates improve the economic performance of firms while improving their environmental performance. In general, a 1% increase in tax rebates increases firm output by 0.5010% and reduce energy intensity by 0.0061%. The above conclusions are still robust after accounting for endogeneity. (2) Tax rebates have a stronger impact on the economic and environmental performances of private firms, firms in the central region of China and firms with high production capacity. (3) Tax rebates contribute to the economic and environmental performance of firms by improving their technological innovation and production efficiency. Further analysis shows that tax rebates have an incentive effect rather than an anti-driving effect on technological innovation. This study provides a theoretical basis for the use of tax rebate policies to achieve carbon peak and carbon neutrality goals, and enriches the theoretical research on taxation.

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第 123 条，共 300 条

标题: Intensified continental chemical weathering and carbon-cycle perturbations linked to volcanism during the Triassic-Jurassic transition

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Web of Science 核心合集中的 "被引频次": 36

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摘要: Direct evidence of intense chemical weathering induced by volcanism is rare in sedimentary successions. Here, we undertake a multiproxy analysis (including organic carbon isotopes, mercury (Hg) concentrations and isotopes, chemical index of alteration (CIA), and clay minerals) of two well-dated Triassic-Jurassic (T-J) boundary sections representing high- and low/middle-paleolatitude sites. Both sections show increasing CIA in association with Hg peaks near the T-J boundary. We interpret these results as reflecting volcanism-induced intensification of continental chemical weathering, which is also supported by negative mass-independent fractionation (MIF) of odd Hg isotopes. The interval of enhanced chemical weathering persisted for similar to 2 million years, which is consistent with carbon-cycle model results of the time needed to drawdown excess atmospheric CO2 following a carbon release event. Lastly, these data also demonstrate that high-latitude continental settings are more sensitive than low/middle-latitude sites to shifts in weathering intensity during climatic warming events.

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输出日期: 2023-09-04

第 124 条，共 300 条

标题: Electrochemical Biosensors for the Analysis of Breast Cancer Biomarkers: From Design to Application

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来源出版物: ANALYTICAL CHEMISTRY 卷: 94 期: 1 页: 269-296 DOI: 10.1021/acs.analchem.1c04475 出版年: JAN 11 2022

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第 125 条，共 300 条

标题: Approach for evaluating instantaneous impact forces during submarine slide-pipeline interaction considering the inertial action

作者: Fan, N (Fan, Ning); Jiang, JX (Jiang, Jianxiong); Dong, YK (Dong, Youkou); Guo, L (Guo, Lin); Song, LF (Song, Laifu)

来源出版物: OCEAN ENGINEERING 卷: 245 文献号: 110466 DOI: 10.1016/j.oceaneng.2021.110466 提前访问日期: JAN 2022 出版年: FEB 1 2022

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被引频次合计: 32

摘要: With the rapid development of offshore oil and gas exploitation, submarine pipelines have become a common way to transport resources from the subsea wellhead to the production ship and the plant on shore. However, frequent submarine slide hazards pose a serious threat to the safe operation of the pipeline networks, in particular for the pipelines that have to pass through hazardous geological environments. Focusing on the instantaneous impact process of submarine slides on pipelines and the effects of the slide mass-related or pipeline-related parameters, this study includes a series of numerical simulations on the submarine slide-pipeline interaction at Reynolds numbers ranging from 0.36 to 287 via a computational fluid dynamics (CFD) method. The formation mechanism of the instantaneous impact forces is illuminated according to the characteristic analysis of the flow velocity and acceleration field around a pipeline during the slide-pipeline interaction. The conventional hybrid geotechnical-fluid dynamics framework describing the slide-pipeline forces is enhanced by considering the effect of inertial action, and force coefficients of different terms in the framework are quantified according to the CFD results data. Finally, an approach and detailed calculation table for evaluating the instantaneous impact forces are provided and verified by comparison with the previous experiments.

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输出日期: 2023-09-04

第 126 条，共 300 条

标题: Synthesis of MgNiCo LDH hollow structure derived from ZIF-67 as superb adsorbent for Congo red

作者: Wang, X (Wang, Xing); Cheng, B (Cheng, Bei); Zhang, LY (Zhang, Liuyang); Yu, JG (Yu, Jiaguo); Li, YJ (Li, Youji)

来源出版物: JOURNAL OF COLLOID AND INTERFACE SCIENCE 卷: 612 页: 598-607 DOI: 10.1016/j.jcis.2021.12.176 提前访问日期: JAN 2022 出版年: APR 15 2022

Web of Science 核心合集中的 "被引频次": 50

被引频次合计: 51

摘要: Adsorption materials with large specific surface area and porous structures exert a beneficial impact on improving the adsorption performance. In this work, MgNiCo LDH hollow structure (MNC HS) is fabricated through a simple one-step solvothermal method using ZIF-67 as the sacrificial template. Electron microscopy shows that the MNC HS retains the dodecahedral shape of ZIF-67. The as-prepared sample exhibits efficient adsorption for Congo red (CR) in water, which is due to the hierarchical structure and large specific surface area that provides more adsorption sites and electrostatic interaction. The CR adsorption process fits the pseudo-second-order model better by kinetics simulation; while Langmuir model is more accurate than Freundlich model in describing the adsorption isotherms of CR. The maximum adsorption capacity calculated by the Langmuir model can reach 1194.7 mg g(-1), which is much higher than that of the sample MgNiCo LDH (MNC) synthesized by conventional methods. The cycle tests also show that the as-prepared adsorbent has good stability and recycling ability. (C) 2021 Elsevier Inc. All rights reserved.

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第 127 条，共 300 条

标题: Horizontal dynamic response of pile in unsaturated soil considering its construction disturbance effect

作者: Wu, WB (Wu, Wenbing); Yang, ZJ (Yang, Zijian); Liu, X (Liu, Xin); Zhang, YP (Zhang, Yunpeng); Liu, H (Liu, Hao); El Naggar, MH (El Naggar, M. Hesham); Xu, MJ (Xu, Meijuan); Mei, GX (Mei, Guoxiong)

来源出版物: OCEAN ENGINEERING 卷: 245 文献号: 110483 DOI: 10.1016/j.oceaneng.2021.110483 提前访问日期: JAN 2022 出版年: FEB 1 2022

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摘要: Considering the effect of construction disturbance, the horizontal dynamic response of pile embedded in unsaturated soil is investigated when the pile is subjected to time-harmonic horizontal loading and vertical loading. In order to consider this problem, this paper subdivides the inhomogeneous region of pile surrounding soil into a series of sub-zones whose displacements and stresses at the fictitious interface are derived by means of continuous conditions and 3D continuum model. Then, the governing equations of pile are established by using linear elastic Timoshenko beam. Utilizing the Laplace transform and transfer matrix method, the analytical solutions of the dynamic impedance of soil and the horizontal dynamic impedance of pile head are derived. To verify the rationality and accuracy of the present solutions, the computed results are compared with those obtained from existing solutions. Through parametric study method, the influence of construction disturbance range and degree on the horizontal dynamic impedance of pile head is investigated within the low-frequency range concerned in dynamic pile foundation design. The main results show that the variations in the shear modulus and width of boundary zone of pile surrounding soil owing to relaxation effect or compaction effect have a significant influence on the horizontal dynamic response of pile head.

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第 128 条，共 300 条

标题: Particle migration and formation damage during geothermal exploitation from weakly consolidated sandstone reservoirs via water and CO2 recycling

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摘要: Coupled migration and retention of suspended injection particles and reservoir particles can severely damage the formation, especially for weakly consolidated sandstone geothermal reservoirs. Understanding their migration and retention is significant to prevent undesired formation damage. The forces acted on these particles were calculated, and then a comprehensive simulation model was established to analyze the coupled particle migration and retention. Massive detachment of reservoir particles, formation of wormhole-like preferential flow paths, and retention of the injected suspended particles are identified as three successive stages during geothermal energy exploitation via water recycling. The mobile reservoir particles play a leading role in the first two stages, while the injected suspended particles mainly affect the last stage. Sensitivity analysis indicates that the high injection-production pressure difference and low concentration of injected suspended particles are conducive to form preferential flow paths, but a severe local reservoir blockage may occur under high mobile reservoir particles. CO2 can effectively reduce reservoir damage caused by particle migration due to its high mobility and low drag force. Although the region of reservoir particle detachment is large during geothermal energy exploitation via CO2 recycling, more preferential flow paths can form to reduce the formation blockage caused by particle migration. (C)& nbsp;2021 Elsevier Ltd. All rights reserved.

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第 129 条，共 300 条

标题: Effects of depressurization on gas production and water performance from excess-gas and excess-water methane hydrate accumulations

作者: Zhang, LX (Zhang, Lunxiang); Dong, HS (Dong, Hongsheng); Dai, S (Dai, Sheng); Kuang, YM (Kuang, Yangmin); Yang, L (Yang, Lei); Wang, JQ (Wang, Jiaqi); Zhao, JF (Zhao, Jiafei); Song, YC (Song, Yongchen)

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摘要: Depressurization is considered as the most promising technique for hydrate exploitation, as it achieves the highest energy profit ratio and is the most technologically feasible. However, the exploitation of excess-water hydrate accumulations generates high water production, leading to increased cost, poor energy efficiency, and problems with sand during operation. Thus, water management is crucial to gas recovery by the depressurization of different classes of hydrate accumulations, yet relevant studies remain limited. In this study, synthetic hydrate samples were prepared to simulate two types of natural methane hydrate sediments: Class 1 accumulations (excess-gas hydrate) and Class 2 accumulations (excess-water hydrate). Hydrate dissociation was conducted using a variety of depressurization approaches, and MRI imaging was employed to characterize water perfor-mance and methane recovery. Methane hydrate preferentially dissociated along the peripheries of the excess-gas samples due to more efficient heat dissipation. Methane hydrate dissociated more uniformly in the excess-water samples because the high specific heat capacity of water enabled the supply of extra heat. Furthermore, pressure histories, mean intensity change in MRI images, and water variations were monitored to analyze the charac-teristics of hydrate dissociation, changes in porosity, intrinsic permeability and reservoir heat, water and gas production rates, and possible secondary hydrate formation. The results of this study suggest that an optimized depressurization approach, such as stepwise depressurization, could improve methane recovery from Class 1 and Class 2 methane hydrate accumulations.

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第 130 条，共 300 条

标题: Urbanization and ecosystem services: The multi-scale spatial spillover effects and spatial variations

作者: Chen, WX (Chen, Wanxu); Chi, GQ (Chi, Guangqing)

来源出版物: LAND USE POLICY 卷: 114 文献号: 105964 DOI: 10.1016/j.landusepol.2021.105964 提前访问日期: JAN 2022 出版年: MAR 2022

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摘要: Globally, urbanization dramatically undermines ecosystem services (ESs). How to relieve the disturbance of urbanization level (UL) on ESs has become an urgent issue for achieving regional sustainable development. However, the lack of understanding about the linear, nonlinear, spatial, and non-spatial relationships between UL and ESs limits effective ecologically related policymaking and urban planning. This study attempts to identify the spatial effects of UL on ESs with an integrated spatial panel approach by decomposing the spatial autocorrelation and spatial spillover effects at multiscales into direct, indirect, and total effects in the Middle Reaches of the Yangtze River Urban Agglomerations (MRYRUA) of China. A considerable increase was observed in construction land, while an evident decline was observed in cultivated land and forestland from 1995 through 2015. Significant negative spatial autocorrelation was found between UL and ESs. The dominant spatial clustering patterns in MRYRUA were the low-high type (low UL and high comprehensive ESs index) and high-low type (high UL and low comprehensive ESs index). A U-shaped curve between UL and ESs was identified, and UL was found to be negatively associated with ESs in MRYRUA. The negative and indirect effect of UL on ESs suggests that being surrounded by highly urbanized units imposed a negative impact on ESs in the individual unit. Findings from this study provide important implications on alleviating adverse ESs for urban planners and decision makers in fast-growing urban agglomerations worldwide.

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第 131 条，共 300 条

标题: How does industrial structure adjustment reduce CO2 emissions? Spatial and mediation effects analysis for China

作者: Zhao, J (Zhao, Jun); Jiang, QZ (Jiang, Qingzhe); Dong, XC (Dong, Xiucheng); Dong, KY (Dong, Kangyin); Jiang, HD (Jiang, Hongdian)

来源出版物: ENERGY ECONOMICS 卷: 105 文献号: 105704 DOI: 10.1016/j.eneco.2021.105704 提前访问日期: JAN 2022 出版年: JAN 2022

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摘要: To accelerate industrial structure adjustment and effectively mitigate carbon dioxide (CO2) emissions, this study aims to investigate the carbon emission reduction effect of China's industrial structure adjustment. For this purpose, considering the potential spatial effect, the spatial econometric technique is utilized. Also, the industrial structure adjustment is divided into industrial structure upgrading and industrial structure optimization for heterogeneous analysis. Then, we empirically explore the mediating role of energy efficiency in the relationship between industrial structure adjustment and CO2 emissions in China. Three findings are drawn from the estimation results: (1) the index of industrial structure upgrading in China has gradually increased, while the index of industrial structure optimization has displayed a slightly downward trend; (2) industrial structure upgrading shows a significant spatial negative correlation with CO2 emissions, while industrial structure optimization affects CO2 emissions positively; and (3) industrial structure upgrading can reduce CO2 emissions by improving energy efficiency, and industrial structure optimization can exacerbate the greenhouse effect by impeding energy efficiency improvements. Based on these findings, we make several policy suggestions for mitigating CO2 emissions and promoting industrial structure adjustment in China.

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ESI 热点论文: Y

输出日期: 2023-09-04

第 132 条，共 300 条

标题: Connectivity of organic matter pores in the Lower Silurian Longmaxi Formation shale, Sichuan Basin, Southern China: Analyses from helium ion microscope and focused ion beam scanning electron microscope

作者: Zhang, K (Zhang, Kun); Jiang, S (Jiang, Shu); Zhao, R (Zhao, Rui); Wang, PF (Wang, Pengfei); Jia, CZ (Jia, Chengzao); Song, Y (Song, Yan)

来源出版物: GEOLOGICAL JOURNAL 卷: 57 期: 5 页: 1912-1924 DOI: 10.1002/gj.4387 提前访问日期: JAN 2022 出版年: MAY 2022

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摘要: As one of the most important energy sources in the world today, shale gas has attracted extensive research. Numerous scholars agreed that the organic matter (OM) pores in shale provide the main space which benefits effective gas occurrence. However, the connectivity provided by OM pores is more important in the development process than their reservoir properties. A comprehensive portrayal of the 3D connectivity of the OM pores is elaborated in this study. The Lower Silurian Longmaxi shale samples were selected as the research subject. The shale samples are subjected to focused ion beam scanning electron microscope, helium ion microscope observation experiments, 2D microscopic characterization of OM pores, and 3D segmentation extraction. The results indicate that the connectivity of shale is mainly contributed by OM pores. The OM pores have the advantageous structural characteristics of large number per unit area, evenly distributed, regular pore morphology, and large pore size relative to the mineral matrix pores. The OM pores structure in shale is complex with a network structure of small pores nested in large pores, which can increase the adsorption capacity of gas. Besides, the small pores nested in large pores can act as a throat to significantly improve the connectivity. OM pores in the pyrobitumen are interconnected in 3D space, providing the main channels for gas percolation in the shale reservoir.

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第 133 条，共 300 条

标题: Multiple-GPU parallelization of three-dimensional material point method based on single-root complex

作者: Dong, YK (Dong, Youkou); Cui, L (Cui, Lan); Zhang, X (Zhang, Xue)

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摘要: As one of the arbitrary Lagrangian-Eulerian methods, the material point method (MPM) owns intrinsic advantages in simulation of large deformation problems by combining the merits of the Lagrangian and Eulerian approaches. Significant computational intensity is involved in the calculations of the MPM due to its very fine mesh needed to achieve a sufficiently high accuracy. A new multiple-GPU parallel strategy is developed based on a single-root complex architecture of the computer purely within a CUDA environment. Peer-to-Peer (P2P) communication between the GPUs is performed to exchange the information of the crossing particles and ghost element nodes, which is faster than the heavy send/receive operations between different computers through the infiniBand network. Domain decomposition is performed to split the whole computational task over the GPUs with a number of subdomains. The computations within each subdomain are allocated on a corresponding GPU using an enhanced "Particle-List" scheme to tackle the data race during the interpolation from associated particles to common nodes. The acceleration effect of the parallelization is evaluated with two benchmarks cases, mini-slump test after a dam break and cone penetration test in clay, where the maximum speedups with 1 and 8 GPUs are 88 and 604, respectively.

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第 134 条，共 300 条

标题: Unsaturated selenium-enriched MoSe2+x amorphous nanoclusters: One-step photoinduced co-reduction route and its boosted photocatalytic H-2-evolution activity for TiO2

作者: Gao, DD (Gao, Duoduo); Xu, JC (Xu, Jiachao); Chen, F (Chen, Feng); Wang, P (Wang, Ping); Yu, HG (Yu, Huogen)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 305 文献号: 121053 DOI: 10.1016/j.apcatb.2021.121053 提前访问日期: JAN 2022 出版年: MAY 15 2022

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摘要: Maximumly increasing the number of active sites is crucial to improve the H-2-evolution efficiency of cocatalyst. Herein, a rich-active-site regulation strategy by the synergism of unsaturated selenium enrichment and amorphization is developed to precisely construct unsaturated selenium-enriched MoSe2+x amorphous nano-clusters onto the TiO2 via a mild photoinduced co-reduction route by using MoCl5 and dibenzyl diselenide as the precursors. The resulting a-MoSe2+x exposes more unsaturated Se atoms (46.5%) because of its unsaturated Se-enriched configuration, highly irregular arrangement, and ultrasmall size (0.3-1 nm). Photocatalytic tests show that the a-MoSe2+x/TiO2(3 wt%) achieves an optimal H-2-evolution rate (4984.46 mu mol h(-1) g(-1), AQE = 23.90%), with the 4.51-fold enhancement relative to that of c-MoSe2/TiO2. Hence, a rich unsaturated Se-mediated H-2- evolution mechanism is proposed, namely, the abundant unsaturated Se atoms as the active sites can not only provide sufficient proton-adsorption-centers to enrich H+, but also present an outstanding catalytic efficiency to fleetly convert H+ to H-2.

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第 135 条，共 300 条

标题: Adaptive Fuzzy Control for Fractional-Order Interconnected Systems With Unknown Control Directions

作者: Liang, BY (Liang, Bingyun); Zheng, SQ (Zheng, Shiqi); Ahn, CK (Ahn, Choon Ki); Liu, F (Liu, Feng)

来源出版物: IEEE TRANSACTIONS ON FUZZY SYSTEMS 卷: 30 期: 1 页: 75-87 DOI: 10.1109/TFUZZ.2020.3031694 出版年: JAN 2022

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摘要: This article concentrates on the study of the decentralized fuzzy control method for a class of fractional-order interconnected systems with unknown control directions. To overcome the difficulties caused by the multiple unknown control directions in fractional-order systems, a novel fractional-order Nussbaum function technique is proposed. This technique is much more general than those of existing works since it not only handles single/multiple unknown control directions but is also suitable for fractional-/integer-order single/interconnected systems. Based on this technique, a new decentralized adaptive fuzzy control method is proposed for fractional-order interconnected systems with unknown strong interconnections among subsystems. Furthermore, fuzzy logic systems are utilized to approximate unknown nonlinearities. It is proven that the designed controller can guarantee the boundedness of all signals in interconnected systems and the convergence of tracking errors. Two examples are given to show the validity of the proposed method.

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第 136 条，共 300 条

标题: Measuring Spatial Connectivity between patches of the heat source and sink (SCSS): A new index to quantify the heterogeneity impacts of landscape patterns on land surface temperature

作者: Gao, J (Gao, Jing); Gong, J (Gong, Jian); Yang, JX (Yang, Jianxin); Li, JY (Li, Jingye); Li, SC (Li, Shicheng)

来源出版物: LANDSCAPE AND URBAN PLANNING 卷: 217 文献号: 104260 DOI: 10.1016/j.landurbplan.2021.104260 出版年: JAN 2022

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摘要: Studies on the interactions between landscape patterns and land surface temperature (LST) are critical to mitigate urban heat islands (UHIs). However, integrated spatial indices combining both composition and configuration to quantify this relationship requires further development. We present an index of spatial connectivity between patches of the heat source and sink (SCSS) to assess the heterogeneity impact of landscape patterns on LST in Wuhan, China. We examined the relationship between LST and SCSS at the urban (within the urban growth boundaries, UGBs) and city levels, using spatial regression analyses. Results show that: (1) the SCSS and LST presented a significant negative correlation, and the SCSS can explain 76% and 81% of the variability in LST at city level and urban level, respectively; (2) for every 0.1 increase in SCSS, the LST will decrease by 0.96 degrees C at city level, and 1.67 degrees C at urban level; (3) the percentage of the source landscape area should be no more than 62% and the SCSS should not fall below 0.18 to control the UHI effect; (4) maintaining the percentage of the source landscape area at below 18%, and the value of SCSS at over 0.43, will help to bring about a significant cooling effect. Our findings allow a better understanding of the interactions between the spatial heterogeneity and the thermal regulation function of landscapes and provide insights for urban planners to mitigate the UHI effect.

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第 137 条，共 300 条

标题: Self-Supervised Locality Preserving Low-Pass Graph Convolutional Embedding for Large-Scale Hyperspectral Image Clustering

作者: Ding, Y (Ding, Yao); Zhang, ZL (Zhang, Zhili); Zhao, XF (Zhao, Xiaofeng); Cai, YM (Cai, Yaoming); Li, SY (Li, Siye); Deng, B (Deng, Biao); Cai, WW (Cai, Weiwei)

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摘要: Due to prior knowledge deficiency, large spectral variability, and high dimension of hyperspectral image (HSI), HSI clustering is extremally a fundamental but challenging task. Deep clustering methods have achieved remarkable success and have attracted increasing attention in unsupervised HSI classification (HSIC). However, the poor robustness, adaptability, and feature presentation limit their practical applications to complex large-scale HSI datasets. Thus, this article introduces a novel self-supervised locality preserving low-pass graph convolutional embedding method (L2GCC) for large-scale hyperspectral image clustering. Specifically, a spectral-spatial transformation HSI preprocessing mechanism is introduced to learn superpixel-level spectral-spatial features from HSI and reduce the number of graph nodes for subsequent network processing. In addition, locality preserving low-pass graph convolutional embedding autoencoder is proposed, in which the low-pass graph convolution and layerwise graph attention are designed to extract the smoother features and preserve layerwise locality features, respectively. Finally, we develop a self-training strategy, in which a self-training clustering objective employs soft labels to supervise the clustering process and obtain appropriate hidden representations for node clustering. L2GCC is an end-to-end training network, which is jointly optimized by graph reconstruction loss and self-training clustering loss. On Indian Pines, Salinas, and University of Houston 2013 datasets, the clustering accuracy overall accuracies (OAs) of the proposed L2GCC are 73.51%, 83.15%, and 64.12%, respectively.

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第 138 条，共 300 条

标题: Looking Outside the Window: Wide-Context Transformer for the Semantic Segmentation of High-Resolution Remote Sensing Images

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摘要: Long-range contextual information is crucial for the semantic segmentation of high-resolution (HR) remote sensing images (RSIs). However, image cropping operations, commonly used for training neural networks, limit the perception of long-range contexts in large RSIs. To overcome this limitation, we propose a wide-context network (WiCoNet) for the semantic segmentation of HR RSIs. Apart from extracting local features with a conventional convolutional neural network (CNN), the WiCoNet has an extra context branch to aggregate information from a larger image area. Moreover, we introduce a context transformer to embed contextual information from the context branch and selectively project it onto the local features. The context transformer extends the vision transformer, an emerging kind of neural networks, to model the dual-branch semantic correlations. It overcomes the locality limitation of CNNs and enables the WiCoNet to see the bigger picture before segmenting the land-cover/land-use (LCLU) classes. Ablation studies and comparative experiments conducted on several benchmark datasets demonstrate the effectiveness of the proposed method. In addition, we present a new Beijing Land-Use (BLU) dataset. This is a large-scale HR satellite dataset with high-quality and fine-grained reference labels, which can facilitate future studies in this field.

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第 139 条，共 300 条

标题: Does environmental regulatory system drive the green development of China's pollution-intensive industries?

作者: Zou, H (Zou, Han); Zhang, YJ (Zhang, Yijun)

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摘要: Green development is a common goal pursued globally for carbon neutrality, and whether environmental regulatory system drives it in pollution-intensive industries (PIIs) is puzzled. Using provincial panel data of Chinese PIIs during 2005-2017, this paper applied entropy method to integrate existing environmental regulatory system into three types of environmental regulations, and then explored non-linear effects of them on green total factor productivity (GTFP). Several conclusions are generated. The annual growth rate of GTFP is 10.61% and it presents industrial differences. Technical change is the driving factor, while technical efficiency shows inhibiting effect. The effect of command-and-control environmental regulation on GTFP is a significant inverted U-shape curve, which is currently the primary driving role in green development, but it is too strict and increasingly less effective. Both market incentive and voluntary environmental regulations appear as positive U-shape curves, and their proper enhancement is breakthrough for future green development. Besides, market incentive environmental regulation is more effective in PIIs with relatively low pollution, while voluntary environmental regulation is sensitive to PIIs with relatively serious pollution. The Chinese government should allow environmental regulatory system more marketability and voluntariness, and production characteristics and pollution density of targeted industries should be considered.

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标题: SEM petrography of dispersed organic matter in black shales: A review

作者: Liu, B (Liu, Bei); Mastalerz, M (Mastalerz, Maria); Schieber, J (Schieber, Juergen)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 224 文献号: 103874 DOI: 10.1016/j.earscirev.2021.103874 出版年: JAN 2022

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摘要: Organic matter (OM)-hosted pores are important constituents of the pore system of black shales and play a crucial role in determining their methane adsorption capacity and porosity. OM-hosted pores are generally observed and described with scanning electron microscope (SEM) on Ar ion-milled surfaces. However, SEM imaging is not able to reliably distinguish OM types and relate the observed pores to specific macerals. Partly because of this inability to relate organic pores to macerals, the evolution of organic porosity during thermal maturation remains poorly understood. In this paper, we review the petrographic characteristics of dispersed organic matter (DOM) in black shales under the SEM. Organic petrographic classification of DOM developed for reflected-light microscopy is so far the most practical method when describing DOM in black shales under the SEM because this classification has information on the origin of DOM. Therefore, correlative microscopy (combination of reflected-light and electron microscopy) is the most effective method to identify both OM types and OM-hosted pores. This method, however, is not readily available to most researchers. Although identifying OM on the basis of SEM observations is a challenging task, it is achievable provided there is a good understanding of the studied shales, especially their thermal maturity and original OM composition. Therefore, the overall objective of this paper is to review petrographic characteristics of DOM in black shales under the SEM to provide some guidelines for identifying DOM from SEM observations. We also review factors that control the formation and preservation of OM-hosted pores. OM-hosted pores consist of primary and secondary organic pores. Primary organic pores are pores inherited from the biological structure of the original OM. Secondary organic pores develop during hydrocarbon generation and expulsion from oil-prone OM and are hosted by solid bitumen or pyrobitumen. The development of secondary organic pores is controlled by thermal maturity and OM type, and their preservation is subject to thermal maturity, OM content, and mineralogical composition. The presented view of the evolution of micropore and mesopore characteristics of OM with thermal maturity is based on data from the literature. The specific surface area and pore volume of OM in black shales follow parabolic patterns with increasing thermal maturity (quantified via vitrinite reflectance, Ro). The initial increase reflects development of OM-hosted pores, and the subsequent decrease is due to denser stacking of aromatic units in the macromolecular structure of OM, with maximum values (specific surface area - 300 m2/g and pore volume - 0.3 cm3/g) reached at Ro values in the 2.5-3.5% range. The contribution of OM-hosted pores to the pore characteristics of black shales depends on OM content, OM type, and thermal maturity.

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第 141 条，共 300 条

标题: Towards a universal model for orogenic gold systems: A perspective based on Chinese examples with geodynamic, temporal, and deposit-scale structural and geochemical diversity

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摘要: Although the term orogenic gold has become widely accepted over the past 20 years for disseminated-to lode style gold deposits that formed in a variety of tectonic environments within convergent margins, models for orogenic gold systems have remained controversial. The main debates include interpretation of stable isotope and fluid inclusion data that are particularly equivocal for orogenic gold systems, the nature of lithospheric control on the generation of orogenic gold belts, and more critically, the role of deep crustal regional metamorphism or alternatively metasomatized and fertilized mantle lithosphere as sources of ore metals and fluids.& nbsp;The giant to world-class orogenic gold systems of China, now the premier gold producer globally, are in gold provinces or belts of several ages that are mostly marginal to Precambrian cratons or blocks, including the North China Craton and South China Block, an amalgamation of the Yangtze Craton and Cathaysia Block. Deposits from these gold provinces provide crucial evidence to constrain genetic debates. Importantly, following the acceptance that the giant Jiaodong gold province formed over 1700 million years after regional metamorphism in the host terrane, an increasing number of deposits, including the Phanerozoic hypozonal deposit at Danba, are shown to have postdated regional metamorphism and formed from components that were not derived from the host crustal rock sequences. A subcrustal model involving devolatilization of fertilized mantle lithosphere, that was metasomatized via earlier subduction processes involving oceanic sediments and/or altered oceanic crust, is compatible with a variety of data. This includes Ar-40/Ar-36 vs. He-3/He-4 mantle-like plots for gold-related pyrite, sulfur isotope compositions of ore-related sulfides that are incompatible with a crustal source, and PGE distribution patterns of spatially related mafic dykes that implicate elevated sulfide contents of underlying mantle lithosphere. Chinese orogenic gold deposits formed in a variety of tectonic regimes from syn-subduction slab rollback, post-subduction slab breakoff, and lithosphere thinning along craton margins, to continent collision. In all cases, lithosphere-scale shear zones and faults were the conduits for ore fluids and metals derived episodically from devolatilization of a subducted slab and/or long-lived metasomatized and fertilized mantle. These fluids deposited gold mineralization in rock sequences adjacent to subsidiary shear zones and faults from crustal depths of > 20 km to < 5 km, with hydraulic fracturing and fluid phase separation potentially the most important depositional process for lode deposits and fluid-rock reaction dominant in disseminated deposits. As the H2O-CO2 ore fluid containing H2S infiltrated into structural-lithological traps, it reacted with the wall rocks under P-T conditions related to depth of gold deposition to produce a continuum of broadly depth-related alteration mineral assemblages.& nbsp;The characteristics of the widespread orogenic gold systems of China strongly implicate a sub-crustal fluid and metal source for orogenic gold in a variety of gold provinces. Based on deposits from outside of China, where gold provinces are more distal to Precambrian cratons, this source is most likely from the devolatilization of down-going subduction zones and sediment wedges in addition to devolatilization of previously fertilized mantle lithosphere as implied by the Chinese examples.

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标题: Simulation of land-use pattern evolution in hilly mountainous areas of North China: A case study in Jincheng

作者: Xu, HT (Xu, Hongtao); Song, YC (Song, Youcheng); Tian, Y (Tian, Yi)

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摘要: Land-use pattern evolution is vital and essential for regional development. In northern China, hilly mountainous areas are widespread and have frequent mining activities. Analyze of the land-use evolutionary rule is a major barrier for making urban planning and identification suitable for various land-use types in these regions. This study has attempted from the perspective of Earth system science, using the FLUS model to simulate land-use pattern evolution in the stages of 2010-2017 (test) and 2017-2025 (simulation) in Jincheng, Shanxi Province. The results show that (1) at the test stage, the FLUS model can better simulate the change in land-use types. The AUC value of all land-use types was greater than 0.8. Comparing the simulation results with the real land-use pattern in 2017, the global kappa value is 0.75, and the fom value is 0.43, which can be used for the forecast demand. (2) At the simulation stage, comprehensively considering natural, social, and economic factors, the land-use patterns are found to be spatially competitive in different scenarios. The planning scenario (PS) focused on the reasonable distribution of various industries, the ecological protection scenario (EPS) emphasized the importance of ecological land, and the sustainable development scenario (SDS) satisfied the needs of the socioeconomic system for various land-use types. (3) In general, analysis of land-use types change under the 3 different scenarios in the 15 years: the mountainous areas in the east and west were changed from grassland to forest, and the hilly and plain areas in the central part changed from farmland to forest.

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ESI 热点论文: N

输出日期: 2023-09-04

第 143 条，共 300 条

标题: Seismic Data Reconstruction via Wavelet-Based Residual Deep Learning

作者: Liu, NH (Liu, Naihao); Wu, LK (Wu, Lukun); Wang, JL (Wang, Jiale); Wu, H (Wu, Hao); Gao, JH (Gao, Jinghuai); Wang, DH (Wang, Dehua)

来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 60 文献号: 4508213 DOI: 10.1109/TGRS.2022.3152984 出版年: 2022

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摘要: Seismic data reconstruction is one of the essential steps in the seismic data processing. Recently, the deep learning (DL) models have attracted huge attention in seismic exploration, which has been applied to seismic data reconstruction, especially the convolutional neural network (CNN)-based methods. However, the general CNN-based models only consider seismic features in the time domain and do not take into account the frequency features. Moreover, there are detailed features lost due to the downsampling scheme. We propose a wavelet-based residual DL (WRDL) network to reconstruct the incomplete seismic data. By selecting the U-Net as the backbone, we introduce the discrete wavelet transform (DWT) to replace the pooling operations, whose invertibility property benefits reserving the detailed features. Furthermore, the inverse wavelet transform (IWT) with the expansion convolutional layer is introduced to restore the feature maps. In addition, we adopt the residual blocks into the proposed model to promote the training accuracy and avoid the overfitting issue. To accurately and effectively reconstruct the missing seismic data, we propose a hybrid loss function based on the structural similarity (SSIM) loss and the Huber loss. Numerical experiments on synthetic data and field data show that the WRDL model reconstructs the missing seismic data more accurately than the U-Net and MWCNN models, including the irregularly missing seismic data and the consecutively missing seismic data with a big gap. Furthermore, the qualitative and quantitative results demonstrate the advantages of the proposed hybrid loss function over the commonly used traditional loss for seismic data reconstruction.

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第 144 条，共 300 条

标题: Split Depth-Wise Separable Graph-Convolution Network for Road Extraction in Complex Environments From High-Resolution Remote-Sensing Images

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来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 60 文献号: 5614115 DOI: 10.1109/TGRS.2021.3128033 出版年: 2022

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被引频次合计: 40

摘要: Road information from high-resolution remote-sensing images is widely used in various fields, and deep-learning-based methods have effectively shown high road-extraction performance. However, for the detection of roads sealed with tarmac, or covered by trees in high-resolution remote-sensing images, some challenges still limit the accuracy of extraction: 1) large intraclass differences between roads and unclear interclass differences between urban objects, especially roads and buildings; 2) roads occluded by trees, shadows, and buildings are difficult to extract; and 3) lack of high-precision remote-sensing datasets for roads. To increase the accuracy of road extraction from high-resolution remote-sensing images, we propose a split depth-wise (DW) separable graph convolutional network (SGCN). First, we split DW-separable convolution to obtain channel and spatial features, to enhance the expression ability of road features. Thereafter, we present a graph convolutional network to capture global contextual road information in channel and spatial features. The Sobel gradient operator is used to construct an adjacency matrix of the feature graph. A total of 13 deep-learning networks were used on the Massachusetts roads dataset and nine on our self-constructed mountain road dataset, for comparison with our proposed SGCN. Our model achieved a mean intersection over union (mIOU) of 81.65% with an F1-score of 78.99% for the Massachusetts roads dataset, and an mIOU of 62.45% with an F1-score of 45.06% for our proposed dataset. The visualization results showed that SGCN performs better in extracting covered and tiny roads and is able to effectively extract roads from high-resolution remote-sensing images.

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输出日期: 2023-09-04

第 145 条，共 300 条

标题: Target Classification of Similar Spatial Characteristics in Complex Urban Areas by Using Multispectral LiDAR

作者: Luo, BH (Luo, Binhan); Yang, J (Yang, Jian); Song, SL (Song, Shalei); Shi, S (Shi, Shuo); Gong, W (Gong, Wei); Wang, A (Wang, Ao); Du, L (Du, Lin)

来源出版物: REMOTE SENSING 卷: 14 期: 1 文献号: 238 DOI: 10.3390/rs14010238 出版年: JAN 2022

Web of Science 核心合集中的 "被引频次": 23

被引频次合计: 23

摘要: With the rapid modernization, many remote-sensing sensors were developed for classifying urban land and environmental monitoring. Multispectral LiDAR, which serves as a new technology, has exhibited potential in remote-sensing monitoring due to the synchronous acquisition of three-dimension point cloud and spectral information. This study confirmed the potential of multispectral LiDAR for complex urban land cover classification through three comparative methods. Firstly, the Optech Titan LiDAR point cloud was pre-processed and ground filtered. Then, three methods were analyzed: (1) Channel 1, based on Titan data to simulate the classification of a single-band LiDAR; (2) three-channel information and the digital surface model (DSM); and (3) three-channel information and DSM combined with the calculated three normalized difference vegetation indices (NDVIs) for urban land classification. A decision tree was subsequently used in classification based on the combination of intensity information, elevation information, and spectral information. The overall classification accuracies of the point cloud using the single-channel classification and the multispectral LiDAR were 64.66% and 93.82%, respectively. The results show that multispectral LiDAR has excellent potential for classifying land use in complex urban areas due to the availability of spectral information and that the addition of elevation information to the classification process could boost classification accuracy.

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输出日期: 2023-09-04

第 146 条，共 300 条

标题: GCSANet: A Global Context Spatial Attention Deep Learning Network for Remote Sensing Scene Classification

作者: Chen, WT (Chen, Weitao); Ouyang, SB (Ouyang, Shubing); Tong, W (Tong, Wei); Li, XJ (Li, Xianju); Zheng, XW (Zheng, Xiongwei); Wang, LZ (Wang, Lizhe)

来源出版物: IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING 卷: 15 页: 1150-1162 DOI: 10.1109/JSTARS.2022.3141826 出版年: 2022

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摘要: Deep convolutional neural networks have become an indispensable method in remote sensing image scene classification because of their powerful feature extraction capabilities. However, the ability of the models to extract multiscale features and global features on surface objects of complex scenes is currently insufficient. We propose a framework based on global context spatial attention (GCSA) and densely connected convolutional networks to extract multiscale global scene features, called GCSANet. The mixup operation is used to enhance the spatial mixed data of remote sensing images, and the discrete sample space is rendered continuous to improve the smoothness in the neighborhood of the data space. The characteristics of multiscale surface objects are extracted, and their internal dense connection is strengthened by the densely connected backbone network. GCSA is introduced into the densely connected backbone network to encode the context information of the remote sensing scene image into the local features. Experiments were performed on four remote sensing scene datasets to evaluate the performance of GCSANet. The GCSANet achieved the highest classification precision on AID and NWPU datasets and the second-best performance on the UC Merced dataset, indicating the GCSANet can effectively extract the global features of remote sensing images. In addition, the GCSANet presents the highest classification accuracy on the constructed mountain image scene dataset. These results reveal that the GCSANet can effectively extract multiscale global scene features on complex remote sensing scenes. The source codes of this method can be foundin https://github.com/ShubingOuyangcug/GCSANet.

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ESI 高被引论文: Y

ESI 热点论文: N

输出日期: 2023-09-04

第 147 条，共 300 条

标题: Weighted Feature Fusion of Convolutional Neural Network and Graph Attention Network for Hyperspectral Image Classification

作者: Dong, YN (Dong, Yanni); Liu, QW (Liu, Quanwei); Du, B (Du, Bo); Zhang, LP (Zhang, Liangpei)

来源出版物: IEEE TRANSACTIONS ON IMAGE PROCESSING 卷: 31 页: 1559-1572 DOI: 10.1109/TIP.2022.3144017 出版年: 2022

Web of Science 核心合集中的 "被引频次": 68

被引频次合计: 68

摘要: Convolutional Neural Networks (CNN) and Graph Neural Networks (GNN), such as Graph Attention Networks (GAT), are two classic neural network models, which are applied to the processing of grid data and graph data respectively. They have achieved outstanding performance in hyperspectral images (HSIs) classification field, which have attracted great interest. However, CNN has been facing the problem of small samples and GNN has to pay a huge computational cost, which restrict the performance of the two models. In this paper, we propose Weighted Feature Fusion of Convolutional Neural Network and Graph Attention Network (WFCG) for HSI classification, by using the characteristics of superpixel-based GAT and pixel-based CNN, which proved to be complementary. We first establish GAT with the help of superpixel-based encoder and decoder modules. Then we combined the attention mechanism to construct CNN. Finally, the features are weighted fusion with the characteristics of two neural network models. Rigorous experiments on three real-world HSI data sets show WFCG can fully explore the high-dimensional feature of HSI, and obtain competitive results compared to other state-of-the art methods.

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输出日期: 2023-09-04

第 148 条，共 300 条

标题: Reexamination of 2.5-Ga "whiff" of oxygen interval points to anoxic ocean before GOE

作者: Slotznick, SP (Slotznick, Sarah P.); Johnson, JE (Johnson, Jena E.); Rasmussen, B (Rasmussen, Birger); Raub, TD (Raub, Timothy D.); Webb, SM (Webb, Samuel M.); Zi, JW (Zi, Jian-Wei); Kirschvink, JL (Kirschvink, Joseph L.); Fischer, WW (Fischer, Woodward W.)

来源出版物: SCIENCE ADVANCES 卷: 8 期: 1 文献号: eabj7190 DOI: 10.1126/sciadv.abj7190 出版年: JAN 2022

Web of Science 核心合集中的 "被引频次": 31

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摘要: Transient appearances of oxygen have been inferred before the Great Oxygenation Event (GOE) [similar to 2.3 billion years (Ga) ago] based on redox-sensitive elements such as Mo and S-most prominently from the similar to 2.5-Ga Mount McRae Shale in Western Australia. We present new spatially resolved data including synchrotron-based x-ray spectroscopy and secondary ion mass spectrometry to characterize the petrogenesis of the Mount McRae Shale. Sediments were primarily composed of organic matter and volcanic ash (a potential source of Mo), with U-Pb ages revealing extremely low sedimentation rates. Catagenesis created bedding-parallel microfractures, which subsequently acted as fluid pathways for metasomatic alteration and recent oxidative weathering. Our collective observations suggest that the bulk chemical datasets pointing toward a "whiff" of oxygen developed during postdepositional events. Nonzero Delta S-33 in trace-metal-poor, early diagenetic pyrite and the unusually enriched organic carbon at low sedimentation rates instead suggest that environmental oxygen levels were negligible similar to 150 million years before the GOE.

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第 149 条，共 300 条

标题: L-UNet: An LSTM Network for Remote Sensing Image Change Detection

作者: Sun, ST (Sun, Shuting); Mu, L (Mu, Lin); Wang, LZ (Wang, Lizhe); Liu, P (Liu, Peng)

来源出版物: IEEE GEOSCIENCE AND REMOTE SENSING LETTERS 卷: 19 文献号: 8004505 DOI: 10.1109/LGRS.2020.3041530 出版年: 2022

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摘要: Change detection of high-resolution remote sensing images is an important task in earth observation and was extensively investigated. Recently, deep learning has shown to be very successful in plenty of remote sensing tasks. The current deep learning-based change detection method is mainly based on conventional long short-term memory (Conv-LSTM), which does not have spatial characteristics. Since change detection is a process with both spatiality and temporality, it is necessary to propose an end-to-end spatiotemporal network. To achieve this, Conv-LSTM, an extension of the Conv-LSTM structure, is introduced. Since it shares similar spatial characteristics with the convolutional layer, L-UNet, which substitutes partial convolution layers of UNet-to-Conv-LSTM and Atrous L-UNet (AL-UNet), which further using Atrous structure to multiscale spatial information is proposed. Experiments on two data sets are conducted and the proposed methods show the advantages both in quantity and quality when compared with some other methods.

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第 150 条，共 300 条

标题: The role of phyllosilicate partial melting in segregating tungsten and tin deposits in W-Sn metallogenic provinces

作者: Zhao, PL (Zhao, Panlao); Chu, X (Chu, Xu); Williams-Jones, AE (Williams-Jones, Anthony E.); Mao, JW (Mao, Jingwen); Yuan, SD (Yuan, Shunda)

来源出版物: GEOLOGY 卷: 50 期: 1 页: 121-125 DOI: 10.1130/G49248.1 出版年: JAN 1 2022

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摘要: Most tungsten (W) and tin (Sn) deposits are associated with highly evolved granites derived from the anatexis of metasedimentary rocks. They are commonly separated in both space and time, and in the rare cases where the W and Sn mineralization are part of a single deposit, the two metals are temporally separate. The factors controlling this behavior, however, are not well understood. Our compilation of whole-rock geochemical data for W-and Sn-related granites in major W-Sn metallogenic belts shows that the Sn-related granites are generally the products of higher-temperature partial melting (similar to 800 degrees C) than the W-related granites (similar to 750 degrees C). Thermodynamic modeling of partial melting and metal partitioning shows that W is incorporated into the magma formed during low-temperature muscovite-dehydration melting, whereas most of the Sn is released into the magma at a higher temperature during biotite-dehydration melting; the Sn of the magma may be increased significantly if melt is extracted prior to biotite melting. At the same degree of partial melting, the concentrations of the two metals in the partial melt are controlled by their concentration in the protolith. Thus, the nature of the protolith and the melting temperature and subsequent evolution of the magma all influence the metallogenic potential of a magma and, in combination, helped control the spatial and temporal segregation of W and Sn deposits in all major W-Sn metallogenic belts.

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第 151 条，共 300 条

标题: SpectralSpatial and Superpixelwise PCA for Unsupervised Feature Extraction of Hyperspectral Imagery

作者: Zhang, X (Zhang, Xin); Jiang, XW (Jiang, Xinwei); Jiang, JJ (Jiang, Junjun); Zhang, YS (Zhang, Yongshan); Liu, XB (Liu, Xiaobo); Cai, ZH (Cai, Zhihua)

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摘要: As the most classical unsupervised dimension reduction algorithm, principal component analysis (PCA) has been widely used in hyperspectral images (HSIs) preprocessing and analysis tasks. Recently proposed superpixelwise PCA (SuperPCA) has shown promising accuracy where superpixels segmentation technique was first used to segment an HSI to various homogeneous regions and then PCA was adopted in each superpixel block to extract the local features. However, the local features could be ineffective due to the neglect of global information especially in some small homogeneous regions and/or in some large homogeneous regions with mixed ground truth objects. In this article, a novel spectralx2013;spatial and SuperPCA (S-3-PCA) is proposed to learn the effective and low-dimensional features of HSIs. Inspired by SuperPCA we further adopt superpixels-based local reconstruction to filter the HSIs and use the PCA-based global features as the supplement of local features. It turns out that the globalx2013;local and spectralx2013;spatial features can be well exploited. Specifically, each pixel of an HSI is reconstructed by the nearest neighborsx2019; pixels in the same superpixel block, which could eliminate the noise and enhance the spatial information adaptively. After the local reconstruction-based data preprocessing, PCA is performed on each region and the entire HSI to obtain local and global features, respectively. Then we simply concatenate them to get the globalx2013;local and spectralx2013;spatial features for HSIs classification. The experimental results on two HSIs data sets demonstrate the superiority of the proposed method over the state-of-the-art methods. The source code of the proposed model is available at <uri>https://github.com/XinweiJiang/S3-PCA</uri>.

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第 152 条，共 300 条

标题: Atomically Dispersed Transition Metal-Nitrogen-Carbon Bifunctional Oxygen Electrocatalysts for Zinc-Air Batteries: Recent Advances and Future Perspectives

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摘要: Rechargeable zinc-air batteries (ZABs) are currently receiving extensive attention because of their extremely high theoretical specific energy density, low manufacturing costs, and environmental friendliness. Exploring bifunctional catalysts with high activity and stability to overcome sluggish kinetics of oxygen reduction reaction and oxygen evolution reaction is critical for the development of rechargeable ZABs. Atomically dispersed metal-nitrogen-carbon (M-N-C) catalysts possessing prominent advantages of high metal atom utilization and electrocatalytic activity are promising candidates to promote oxygen electrocatalysis. In this work, general principles for designing atomically dispersed M-N-C are reviewed. Then, strategies aiming at enhancing the bifunctional catalytic activity and stability are presented. Finally, the challenges and perspectives of M-N-C bifunctional oxygen catalysts for ZABs are outlined. It is expected that this review will provide insights into the targeted optimization of atomically dispersed M-N-C catalysts in rechargeable ZABs.

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第 153 条，共 300 条

标题: Land-Use/Land-Cover Change Detection Based on Class-Prior Object-Oriented Conditional Random Field Framework for High Spatial Resolution Remote Sensing Imagery

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摘要: High spatial resolution (HSR) remote sensing images can reflect more subtle changes and more specific types of land use and land cover (LULC) due to the abundant spatial geometric information. In this article, a class-prior object-oriented conditional random field (COCRF) framework consisting of a binary change detection (CD) task and a multiclass CD task is proposed to fill the application gap. In the proposed framework, the class-prior knowledge is used to improve the construction of the unary potential in both the binary and multiclass CD tasks, to reduce the influence of spectral variability. The binary CD result provides a constraint to the multiclass CD result. As a result, both parts have effective interaction. The class posterior probability images of two dates can be obtained automatically with the class-prior knowledge by sample migration. Furthermore, an object constraint described by the class dispersion within the objects is added to improve the smoothness in local objects, while the pairwise potential improves the smoothness of the whole area by using the eight-neighborhood spectral information of the center pixel. By integrating the above approaches, the problems of error accumulation and the manual intervention required in the traditional multiclass CD methods can be relieved. An adaptive parameter estimation strategy is also adopted in the proposed framework, to save the time required for manual parameter setting. The proposed COCRF framework was validated on two HSR remote sensing image data sets, where it achieved a better performance than the other state-of-the-art CD methods.

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第 154 条，共 300 条

标题: An Efficient Alternating Algorithm for the L-p-Norm Cross-Gradient Joint Inversion of Gravity and Magnetic Data Using the 2-D Fast Fourier Transform

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摘要: An efficient algorithm for the Lp-norm joint inversion of gravity and magnetic data using the cross-gradient constraint is presented. The presented framework incorporates stabilizers that use Lp-norms (0 <= p <= 2) of the model parameters, and/or the gradient of the model parameters. The formulation is developed from standard approaches for independent inversion of single data sets, and, thus, also facilitates the inclusion of necessary model and data weighting matrices, for example, depth weighting and hard constraint matrices. Using the block Toeplitz Toeplitz block structure of the underlying sensitivity matrices for gravity and magnetic models, when data are obtained on a uniform grid, the blocks for each layer of the depth are embedded in block circulant circulant block matrices. Then, all operations with these matrices are implemented efficiently using 2-D fast Fourier transforms, with a significant reduction in storage requirements. The nonlinear global objective function is minimized iteratively by imposing stationarity on the linear equation that results from applying linearization of the objective function about a starting model. To numerically solve the resulting linear system, at each iteration, the conjugate gradient algorithm is used. This is improved for large scale problems by the introduction of an algorithm in which updates for the magnetic and gravity parameter models are alternated at each iteration, further reducing total computational cost and storage requirements. Numerical results using a complicated 3-D synthetic model and real data sets obtained over the Galinge iron-ore deposit in the Qinghai province, north-west (NW) of China, demonstrate the efficiency of the presented algorithm.

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第 155 条，共 300 条

标题: Evaluation of the Vegetation-Index-Based Dimidiate Pixel Model for Fractional Vegetation Cover Estimation

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摘要: Remote sensing estimation based on the dimidiate pixel model (DPM) using vegetation indices (VIs) is a common approach for mapping fractional vegetation cover (FVC). The major drawback of DPM is that it does not consider real endmember conditions and multiple scattering between soil and vegetation. An analysis of FVC uncertainties caused by these model deficiencies is still lacking. Here, we first calculated the FVC theoretical uncertainty caused by reflectance uncertainties based on the law of prapagation of uncertainty (LPU). Then, we tested the performance of DPM using six VIs over 3-D forest scenes. We simulated both Aqua-MODIS and Landsat-OLI surface reflectance (SR) at their corresponding spatial resolutions and spectral response functions (SRFs) using a well-validated 3-D radiative transfer (RT) model which helps to separate the model and input uncertainties. We found that ratio vegetation index (RVI)- and enhanced vegetation index (EVI)-based models were most affected by sensors, followed by the normalized difference vegetation index (NDVI)-, enhanced vegetation index 2 (EVI2)-, renormalized difference vegetation index (RDVI)-, and difference vegetation index (DVI)-based models. Without considering SR uncertainties, the DVI-based model performed best (FVC absolute difference < 0.1); however, the commonly used NDVI model reached a maximum difference of 0.35. At the same time, input uncertainty increased the uncertainty of FVC retrieval. We noticed that the increase of solar zenith angle (SZA) resulted in a clear increase of retrieved FVC under the uniform distribution, which can be explained by the increased shadow proportion. Besides, model accuracy was dominated by the purity of soil (vegetation) endmember in low (high) vegetation cover area. This study provides a reference for the selection of the optimal VI for FVC retrieval based on the DPM.

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第 156 条，共 300 条

标题: Optimizing Atomic Hydrogen Desorption of Sulfur-Rich NiS1+x Cocatalyst for Boosting Photocatalytic H-2 Evolution

作者: Gao, DD (Gao, Duoduo); Xu, JC (Xu, Jiachao); Wang, LX (Wang, Linxi); Zhu, BC (Zhu, Bicheng); Yu, HG (Yu, Huogen); Yu, JG (Yu, Jiaguo)

来源出版物: ADVANCED MATERIALS 卷: 34 期: 6 文献号: 2108475 DOI: 10.1002/adma.202108475 提前访问日期: DEC 2021 出版年: FEB 2022

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摘要: Low-cost transition-metal chalcogenides (MSx) are demonstrated to be potential candidate cocatalyst for photocatalytic H-2 generation. However, their H-2-generation performance is limited by insufficient quantities of exposed sulfur (S) sites and their strong bonding with adsorbed hydrogen atoms (S-H-ads). To address these issues, an efficient coupling strategy of active-site-enriched regulation and electronic structure modification of active S sites is developed by rational design of core-shell Au@NiS1+x nanostructured cocatalyst. In this case, the Au@NiS1+x cocatalyst can be skillfully fabricated to synthesize the Au@NiS1+x modified TiO2 (denoted as TiO2/Au@NiS1+x) by a two-step route. Photocatalytic experiments exhibit that the resulting TiO2/Au@NiS1+x(1.7:1.3) displays a boosted H-2-generation rate of 9616 mu mol h(-1) g(-1) with an apparent quantum efficiency of 46.0% at 365 nm, which is 2.9 and 1.7 times the rate over TiO2/NiS1+x and TiO2/Au, respectively. In situ/ex situ XPS characterization and density functional theory calculations reveal that the free-electrons of Au can transfer to sulfur-enriched NiS1+x to induce the generation of electron-enriched S-delta(-) active centers, which boosts the desorption of H-ads for rapid hydrogen formation via weakening the strong S-H-ads bonds. Hence, an electron-enriched S-delta(-)-mediated mechanism is proposed. This work delivers a universal strategy for simultaneously increasing the active site number and optimizing the binding strength between the active sites and hydrogen adsorbates.

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第 157 条，共 300 条

标题: Step-by-Step Mechanism Insights into the TiO2/Ce2S3 S-Scheme Photocatalyst for Enhanced Aniline Production with Water as a Proton Source

作者: Xu, FY (Xu, Feiyan); Meng, K (Meng, Kai); Cao, S (Cao, Shuang); Jiang, CH (Jiang, Chenhui); Chen, T (Chen, Tao); Xu, JS (Xu, Jingsan); Yu, JG (Yu, Jiaguo)

来源出版物: ACS CATALYSIS 卷: 12 期: 1 页: 164-172 DOI: 10.1021/acscatal.1c04903 提前访问日期: DEC 2021 出版年: JAN 7 2022

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摘要: Exploring heterostructured photocatalysts for the photocatalytic hydrogenation reaction with water as a proton source and investigating the corresponding intrinsic step-by-step mechanism are of great interest. Here, we develop an S-scheme heterojunction through theoretical design and carried out solvothermal growth of Ce2S3 nanoparticles (NPs) onto electrospun TiO2 nanofibers. The low-dimensional (0D/1D) heterostructure unveils enhanced photocatalytic activity for aniline production by nitrobenzene hydrogenation with water as a proton source. Density functional theory (DFT) calculations indicate the electrons transfer from Ce2S3 to TiO2 upon hybridization due to their Fermi level difference and creates an internal electric field at the interface, driving the separation of the photoexcited charge carriers, which is authenticated by in situ X-ray photoelectron spectroscopy along with femtosecond transient absorption spectroscopy. The step-by-step reaction mechanism of the photocatalytic nitrobenzene hydrogenation to yield aniline is revealed by in situ diffuse reflectance infrared Fourier transform spectroscopy, associated with DFT computational prediction.

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标题: Hierarchically Porous ZnO/g-C3N4S-Scheme Heterojunction Photocatalyst for Efficient H2O2 Production

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摘要: The design of photocatalysts with hierarchical pore sizes is an effective method to improve mass transport, enhance light absorption, and increase specific surface area. Moreover, the construction of a heterojunction at the interface of two semiconductor photocatalysts with suitable band positions plays a crucial role in separating and transporting charge carriers. Herein, ZIF-8 and urea are used as precursors to prepare hierarchically porous ZnO/g-C3N4 S-scheme heterojunction photocatalysts through a two-step calcination method. This S-scheme hetero- junction photocatalyst shows high activity toward photocatalytic H2O2 production, which is 3.4 and 5.0 times higher than that of pure g-C3N4 and ZnO, respectively. The mechanism of charge transfer and separation within the S-scheme heterojunction is studied by Kelvin probe, in situ irradiated X-ray photoelectron spectroscopy (ISI-XPS), and electron paramagnetic resonance (EPR). This research provides an idea of designing S-scheme heterojunction photocatalysts with hierarchical pores in efficient photocatalytic hydrogen peroxide production.

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第 159 条，共 300 条

标题: Electron-ion collider in China

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摘要: Lepton scattering is an established ideal tool for studying inner structure of small particles such as nucleons as well as nuclei. As a future high energy nuclear physics project, an Electron-ion collider in China (EicC) has been proposed. It will be constructed based on an upgraded heavy-ion accelerator, High Intensity heavy-ion Accelerator Facility (HIAF) which is currently under construction, together with a new electron ring. The proposed collider will provide highly polarized electrons (with a polarization of similar to 80%) and protons (with a polarization of similar to 70%) with variable center of mass energies from 15 to 20 GeV and the luminosity of (2-3) x 10(33) cm(-2) . s(-1). Polarized deuterons and Helium-3, as well as unpolarized ion beams from Carbon to Uranium, will be also available at the EicC.The main foci of the EicC will be precision measurements of the structure of the nucleon in the sea quark region, including 3D tomography of nucleon; the partonic structure of nuclei and the parton interaction with the nuclear environment; the exotic states, especially those with heavy flavor quark contents. In addition, issues fundamental to understanding the origin of mass could be addressed by measurements of heavy quarkonia near-threshold production at the EicC. In order to achieve the above-mentioned physics goals, a hermetical detector system will be constructed with cutting-edge technologies.This document is the result of collective contributions and valuable inputs from experts across the globe. The EicC physics program complements the ongoing scientific programs at the Jefferson Laboratory and the future EIC project in the United States. The success of this project will also advance both nuclear and particle physics as well as accelerator and detector technology in China.

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第 160 条，共 300 条

标题: Tissue-derived carbon microbelt paper: a high-initial-coulombic-efficiency and low-discharge-platform K+-storage anode for 4.5 V hybrid capacitors

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摘要: Hard carbon (HC) is a promising anode material for K+-storage due to its randomly oriented turbostratic structure. However, most reported HC anodes exhibit low initial coulombic efficiency (ICE) and no obvious discharge platform during K+-intercalation/deintercalation, thus restricting their practical application. Herein, cheap and renewable sanitary tissue is utilized as the precursor to construct a flexible self-supporting hard carbon microbelt paper (HCMB). As a binder-free anode, the HCMB can achieve a high ICE value of 88% with a high charge capacity below 1 V (204 mA h g(-1) at 100 mA g(-1)), excellent rate capability (151 mA h g(-1) at 1000 mA g(-1)) and superior cycling stability in a conventional KPF6-based electrolyte. More importantly, the HCMB-based anodes exhibit a rather low discharge platform, which is close to a graphite anode (0.25 V vs. K/K+). To demonstrate its practical use, a novel 4.5 V potassium ion capacitor (PIC) device is successfully constructed based on the HCMB anode and an activated carbon cathode together with a gel polymer electrolyte. The energy density of this hybrid system is up to 152 W h kg(-1), and is still maintained as high as 112 W h kg(-1) at a high power density of 17 500 W kg(-1). In addition, the effect of the carbonization temperature on the K+-storage behavior of HCMB and its comparison with carbon counterparts (graphite and soft carbon) are systematically investigated.

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标题: Investigation of near-global daytime boundary layer height using high-resolution radiosondes: first results and comparison with ERA5, MERRA-2, JRA-55, and NCEP-2 reanalyses

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摘要: The planetary boundary layer (PBL) governs the vertical transport of mass, momentum, and moisture between the surface and the free atmosphere, and thus the determination of PBL height (BLH) is recognized as crucial for air quality, weather, and climate analysis. Although reanalysis products can provide important insight into the global view of BLH in a seamless way, the BLH observed in situ on a global scale remains poorly understood due to the lack of high-resolution (1 or 2 s) radiosonde measurements. The present study attempts to establish a near-global BLH climatology at synoptic times (00:00 and 12:00 UTC) and in the daytime using high-resolution radiosonde measurements over 300 radiosonde sites worldwide for the period 2012 to 2019, which is then compared against the BLHs obtained from four reanalysis datasets, including ERA5, MERRA-2, JRA-55, and NCEP-2. The variations in daytime BLH exhibit large spatial and temporal dependence, and as a result the BLH maxima are generally discerned over the regions such as the western United States and western China, in which the balloon launch times mostly correspond to the afternoon. The diurnal variations in BLH are revealed with a peak at 17:00 local solar time (LST). The most promising reanalysis product is ERA5, which underestimates BLH by around 130 m as compared to radiosondes released during daytime. In addition, MERRA-2 is a well-established product and has an underestimation of around 160 m. JRA-55 and NCEP-2 might produce considerable additional uncertainties, with a much larger underestimation of up to 400 m. The largest bias in the reanalysis data appears over the western United States and western China, and it might be attributed to the maximal BLH in the afternoon when the PBL has risen. Statistical analyses further indicate that the biases of reanalysis BLH products are positively associated with orographic complexity, as well as the occurrence of static instability. To our best knowledge, this study presents the first near-global view of high-resolution radiosonde-derived boundary layer height and provides a quantitative assessment of the four frequently used reanalysis products.

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标题: Deep learning for geological hazards analysis: Data, models, applications, and opportunities

作者: Ma, ZJ (Ma, Zhengjing); Mei, G (Mei, Gang)

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摘要: As natural disasters are induced by geodynamic activities or abnormal changes in the environment, geological hazards tend to wreak havoc on the environment and human society. Recently, the dramatic increase in the volume of various types of Earth observation 'big data' from multiple sources, and the rapid development of deep learning as a state-of-the-art data analysis tool, have enabled novel advances in geological hazard analysis, with the ultimate aim to mitigate the devastation associated with these hazards. Motivated by numerous applications, this paper presents an overview of the advances in the utilization of deep learning for geological hazard analysis. First, six commonly available Earth observation data sources are described, e.g., unmanned aerial vehicles, satellite platforms, and in-situ monitoring systems. Second, the deep learning background and six typical deep learning models are introduced, such as convolutional neural networks and recurrent neural networks. Third, focusing on six typical geological hazards, i.e., landslides, debris flows, rockfalls, avalanches, earthquakes, and volcanoes, the deep learning applications for geological hazard analysis are reviewed, and common application paradigms are summarized. Finally, the challenges and opportunities for the application of deep learning models for geological hazard analysis are highlighted, with the aim to inspire further related research.

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第 163 条，共 300 条

标题: Potassium and its isotope behaviour during chemical weathering in a tropical catchment affected by evaporite dissolution

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摘要: This work presents the systematic investigation of K contents and stable K isotopic compositions of surface waters, groundwater, wastewaters, suspended particles, bed sediments, and fertilizers in the Upper Mun Rive catchment, northeast Thailand. This area is of particular interest because its abundant potash deposits and intensive agricultural activities and urbanization, therefore this will improve our understanding whether the K isotope is robust enough to resist evaporite dissolution and anthropogenic disturbances on tracing silicate weathering in the highly weathered tropical region. The dissolved loads in surface waters and shallow groundwater display the large variation in 641Kdiss values from -0.54 parts per thousand to +0.09 parts per thousand relative to suspended particles (-0.60 parts per thousand to-0.41 parts per thousand), river bed sediments (-0.54 parts per thousand to-0.47 parts per thousand the upper continental crust (UCC,-0.44 +/- 0.05%), which agrees with the fact that 39K is preferentially retained in weathering products during silicate weathering. The wet and dry seasons difference ranging from-0.05% to +0.10% 641K, which is slightly greater than our long-term analytical uncertainty of +/- 0.06%. There is likely a limited K input from evaporites dissolution due to weak correlation between delta K-41(diss) values and Cl concentrations or Cl/K ratios in the UMR and world rivers, while a major tributary Takhong River is clearly influenced by the contribution of domestic sewage with lower delta K-41 and higher delta N-15 values. Based on a mass balance of K budge, the dissolved K in the UMR is mostly (>90%) derived from silicate weathering in the unpolluted area, this is consistent with previous studies of large river basins, and the evaporite dissolution and other non-silicate sources may not strongly influence dissolved K and delta K-41(diss) values in rivers, even in evaporite-rich catchment. Therefore, K isotopes cannot be used as lithological tracers in catchments, rather the K isotopic fractionation mainly occurs during silicate weathering, such as the formation of secondary minerals which favor light isotope. Hence, the mechanism of K isotopic fractionation linked to secondary minerals K uptake needs further consideration. Overall, these results clearly show that K isotopes could be an ideal indicator to constrain silicate weathering processes and anthropogenic inputs at catchment scale. (C) 2021 Elsevier Ltd. All rights reserved.

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标题: Central China Orogenic Belt and amalgamation of East Asian continents

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摘要: The Central China Orogenic Belt (CCOB) comprises, from the east to the west, the Tongbai-Dabie, Qinling, Qilian and Kunlun Orogens, and preserves abundant and important amalgamation records of the North China, South China, Qaidam, Tarim and Qiangtang Blocks. The CCOB offers an excellent window to the tectonic evolution from Proto-Tethys to Paleo-Tethys domains and the formation of East Asian continent. In this Centennial Review of Gondwana Research, we assemble comprehensive and multidisciplinary information of geological, geochemical, geophysical and high-precision geochronological dataset from individual orogens of the CCOB, together with a synthesis of Paleomagnetic data, to gain insights on the tectonic framework and evolutionary history of CCOB. The detailed and highly-integrated analysis leads to the following major conclusions. (1) Prior to ca. 550 Ma, break-up of the Rodinia supercontinent led to the formation of Proto-Tethys Ocean, wherein the above crustal blocks were isolated discrete units. (2) During ca. 541-485 Ma, spreading of all the embranchments of the Proto-Tethys Ocean at the early stage and the onset of subduction at the late stage. (3) Up to ca. 485-444 Ma, continued subduction of the Proto-Tethys Oceans resulted in opening and closing of the back-arc basin in the Qinling area. (4) During ca. 444-420 Ma, the Proto-Tethys Oceans along the Qilian and Shangdan were closing. (5) During ca. 420-300 Ma, the Paleo-Tethys Ocean in the Kunlun area inherited the Proto-Tethys Ocean, while the Paleo-Tethyan Mianlue Ocean experienced spreading. (6) At ca. 300-250 Ma, subduction retreat of the Kunlun Ocean occurred from the Aqikekulehu-Kunzhong suture to the Muztagh-Buqingshan-Anemaqen suture. (7) The Paleo-Tethys Ocean underwent eastward diachronous closing processes throughout the Kunlun to Qinling and Dabie areas during ca. 250-200 Ma; (8) The entire CCOB range has evolved into intracontinental deformation since 200 Ma. (c) 2021 International Association for Gondwana Research Published by Elsevier B.V. All rights reserved.

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标题: Plate tectonics: What, where, why, and when?

作者: Palin, RM (Palin, Richard M.); Santosh, M (Santosh, M.)

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摘要: The theory of plate tectonics is widely accepted by scientists and provides a robust framework with which to describe and predict the behavior of Earth's rigid outer shell - the lithosphere - in space and time. Expressions of plate tectonic interactions at the Earth's surface also provide critical insight into the machinations of our planet's inaccessible interior, and allow postulation about the geological characteristics of other rocky bodies in our solar system and beyond. Formalization of this paradigm occurred at a landmark Penrose conference in 1969, representing the culmination of centuries of study, and our understanding of the ''what", ''where", ''why", and ''when" of plate tectonics on Earth has continued to improve since. In this Centennial review, we summarize the major discoveries that have been made in these fields and present a modern-day holistic model for the geodynamic evolution of the Earth that best accommodates key lines of evidence for its changes over time. Plate tectonics probably began at a global scale during the Mesoarchean (c. 2.9-3.0 Ga), with firm evidence for subduction in older geological terranes accounted for by isolated plate tectonic 'microcells' that initiated at the heads of mantle plumes. Such early subduction likely operated at shallow angles and was short-lived, owing to the buoyancy and low rigidity of hotter oceanic lithosphere. A transitional period during the Neoarchean and Paleoproterozoic/Mesoproterozoic was characterized by continued secular cooling of the Earth's mantle, which reduced the buoyancy of oceanic lithosphere and increased its strength, allowing the angle of subduction at convergent plate margins to gradually steepen. The appearance of rocks during the Neoproterozoic (c. 0.8-0.9 Ga) diagnostic of subduction do not mark the onset of plate tectonics, but simply record the beginning of modern-style cold, deep, and steep subduction that is an end-member state of an earlier, hotter, mobile lid regime. (c) 2020 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Craton and thick lithosphere margins: The sites of giant mineral deposits and mineral provinces

作者: Groves, DI (Groves, D., I); Santosh, M (Santosh, M.)

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摘要: Although most economic geology research is concentrated at the deposit or mineral-system scale for a single well-defined deposit group with a consistent metal association, there are both academic and economic advantages in considering the similar geodynamic setting of deposits having contrasting metal compositions that are traditionally considered unrelated. As an example, there are a range of mineral deposit types or systems that are spatially associated with the margins of long-lived, relatively cold, buoyant Precambrian cratons or lithosphere with thick mantle lithosphere roots. These diverse hypogene deposit groups include world-class to giant BIF-derived iron ores, Kiruna-type Fe-P deposits, anorthositehosted ilmenite deposits, IOCG deposits, carbonatite-associated REE-P-Nb-(Cu) ores, intrusion-hosted NiCu-PGE sulfide ores, SEDEX (and MVT) Pb-Zn-Cu deposits, Zambian Copperbelt-type Cu-Co, and IOCG deposits, that provide a high proportion of the global metal inventory. Their preservation, some older than 2 Giga-years, is due to the buoyancy of the thick, cold cratonic lithosphere. Deep extensional fault systems develop on these craton margins during rifting, leading to deposition of continental-shelf sedimentary sequences that provide both suitable host rocks for mineralization and metal and sulfur-rich high-salinity fluid sources. The long-lived lithosphere margins with fluctuating stress fields enhance the Pb-Zn-Cu endowment potential of these basins by promoting synbasinal or later gravity-driven flow of high-salinity brines. Compressional or transpressional reactivation drives syn-orogenic fluid flow to produce the Cu-Co ores of the Zambian Copperbelt, or provide the pre ore thrust architecture of fluid seals over reactive carbonate sequences for Carlin-type gold ores. The deep faults provided preferred conduits for the emplacement of mafic-ultramafic intrusions, with Ni-Cu-PGE sulfide deposits formed within complexities in the magma plumbing systems. The magmatic-hydrothermal group of carbonatite-related REE-P-Nb-Cu, IOCG deposits, and IRGD systems, and the hydrothermal Carlin-type deposits, all formed under extensional high heat-flow tectonic regimes and derived their ore fluids, with the probable exception of Carlin-type ores, from metal-and volatile-fertilized subcontinental lithosphere below the craton margin. The orogenic gold deposits on craton margins in China were also formed during transpressional geodynamic episodes from ore fluids with a fertilized mantle lithosphere source. A detailed analysis shows that most deposit types are sited within 100 km of the margins of Archean cratons, although sediment-hosted Pb-Zn-Cu deposits, that show no obvious relationships to craton margins, require a buffer of 200 km for thick Paleoproterozoic lithospheric blocks. These features brought out in this paper can potentially aid mineral exploration in terms of initial area selection within the available search space, but precise definition of these buffer zones is difficult due to heterogeneity of constraints on the precise location of craton and thick lithosphere boundaries globally. However, the search space for this diverse group of deposits is limited to between 10 and 35% of the continental crust in different regions, within which geophysical methodologies can further constrain more prospective targets. (c) 2020 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 167 条，共 300 条

标题: The great Yanshanian metallogenic event of eastern Asia: Consequences from one hundred million years of plate margin geodynamics

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来源出版物: GONDWANA RESEARCH 卷: 100 特刊: SI 页: 223-250 DOI: 10.1016/j.gr.2021.02.020 提前访问日期: NOV 2021 出版年: DEC 2021

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摘要: Yanshanian (ca. 200-100 Ma) metallogeny of eastern Asia was dominantly controlled by oblique subduction and rollback of the Izanagi plate, and also, more locally in the north, by closure of the Mudanjiang Ocean basin and accretion of the Bureya-Jiamusi-Khanka block and the Sikhote-Alin terranes. Although exact distances are difficult to estimate due to Early Cretaceous crustal extension, ores related to Yanshanian subduction certainly developed for more than 1500 km landward from the active trench, such as exemplified by those deposits overprinting the Paleoproterozoic Trans-North China orogen. In the northern part of the Yanshanian orogen, and thus hosted within the eastern edge of the Central Asian orogenic belt, Endako-type porphyry Mo deposits related to subduction of the Mudanjiang slab formed throughout northeast China from 200 to 135 Ma. Extensional magmatism related to rollback of the slab led to widespread AuAg epithermal vein development and a scattering of small Cu-Au porphyry occurrences across the same area from 125 to 100 Ma. Sinistral strike-slip motion along the continental margin in adjacent Russia, caused by the NNW motion of the Izanagi plate, led to formation of 115-95 Ma post-collisional Cu-Au porphyries, Sn-W ores associated with reduced intrusions, and orogenic gold deposits in the central SikhoteAlin region. In the North China block, whereas early Yanshanian ore formation was relatively limited, 130-120 Ma extension-related basement uplifts were associated with formation of two of China's most important orogenic gold provinces on the Jiaodong Peninsula and in the East Qinling; in the latter, the entire period of late Yanshanian extension may be defined by widespread 148-107 Ma Mo-rich porphyry and skarn deposit formation. To the south along the Asian margin, the oblique NW-directed subduction of the Izanagi slab was responsible for the adakitic porphyry Cu deposit formation on the eastern side of the South China block at 175-155 Ma, which continued inland for as much as 500 km to the CathaysiaYangtze suture. The transition at 160-150 Ma to development of the Nanling W-Sn belt in the interior of Cathaysia roughly overlaps the time of tectonic switch to slab retreat, which gradually led to seaward migration of the extension-related magmatism forming the 145-133 Ma Sn ores and 110-100 Ma high to low sulfidation epithermal deposits along the Southeast Coast belt. A period of sinistral strike-slip along the southern end of the Tan-Lu fault system was possibly responsible for a tear in the Izanagi plate and consequential S-type magmatism forming W porphyry-skarn ores of the Jiangnan belt at 145-133 Ma and I type magmatism leading to Fe-Cu-Au skarns at the northern edge of the Yangtze block. In summary, the early Yanshanian of eastern Asia was dominated by widespread subduction-related porphyry Mo formation in the north and localized porphyry Cu formation to the south, followed by late Yanshanian development of world-class Au, Mo, Sn, and W resources during subsequent slab retreat, continental-scale extension, and strike-slip events along continental margin transform faults. (c) 2021 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 168 条，共 300 条

标题: Landslide susceptibility zonation method based on C5.0 decision tree and K-means cluster algorithms to improve the efficiency of risk management

作者: Guo, ZZ (Guo, Zizheng); Shi, Y (Shi, Yu); Huang, FM (Huang, Faming); Fan, XM (Fan, Xuanmei); Huang, JS (Huang, Jinsong)

来源出版物: GEOSCIENCE FRONTIERS 卷: 12 期: 6 文献号: 101249 DOI: 10.1016/j.gsf.2021.101249 出版年: NOV 2021

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摘要: Machine learning algorithms are an important measure with which to perform landslide susceptibility assessments, but most studies use GIS-based classification methods to conduct susceptibility zonation. This study presents a machine learning approach based on the C5.0 decision tree (DT) model and the K-means cluster algorithm to produce a regional landslide susceptibility map. Yanchang County, a typical landslide-prone area located in northwestern China, was taken as the area of interest to introduce the proposed application procedure. A landslide inventory containing 82 landslides was prepared and subsequently randomly partitioned into two subsets: training data (70% landslide pixels) and validation data (30% landslide pixels). Fourteen landslide influencing factors were considered in the input dataset and were used to calculate the landslide occurrence probability based on the C5.0 decision tree model. Susceptibility zonation was implemented according to the cut-off values calculated by the K-means cluster algorithm. The validation results of the model performance analysis showed that the AUC (area under the receiver operating characteristic (ROC) curve) of the proposed model was the highest, reaching 0.88, compared with traditional models (support vector machine (SVM) = 0.85, Bayesian network (BN) = 0.81, frequency ratio (FR) = 0.75, weight of evidence (WOE) = 0.76). The landslide frequency ratio and frequency density of the high susceptibility zones were 6.76/km(2) and 0.88/km(2), respectively, which were much higher than those of the low susceptibility zones. The top 20% interval of landslide occurrence probability contained 89% of the historical landslides but only accounted for 10.3% of the total area. Our results indicate that the distribution of high susceptibility zones was more focused without containing more "stable" pixels. Therefore, the obtained susceptibility map is suitable for application to landslide risk management practices. (C) 2021 China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V.

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第 169 条，共 300 条

标题: Inorganic Metal-Oxide Photocatalyst for H2O2 Production

作者: Wang, LX (Wang, Linxi); Zhang, JJ (Zhang, Jianjun); Zhang, Y (Zhang, Yong); Yu, HG (Yu, Huogen); Qu, YH (Qu, Yinhu); Yu, JG (Yu, Jiaguo)

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摘要: Hydrogen peroxide (H2O2) is a mild but versatile oxidizing agent with extensive applications in bleaching, wastewater purification, medical treatment, and chemical synthesis. The state-of-art H2O2 production via anthraquinone oxidation is hardly considered a cost-efficient and environment-friendly process because it requires high energy input and generates hazardous organic wastes. Photocatalytic H2O2 production is a green, sustainable, and inexpensive process which only needs water and gaseous dioxygen as the raw materials and sunlight as the power source. Inorganic metal oxide semiconductors are good candidates for photocatalytic H2O2 production due to their abundance in nature, biocompatibility, exceptional stability, and low cost. Progress has been made to enhance the photocatalytic activity toward H2O2 production, however, H2O2 photosynthesis is still in the laboratory research phase since the productivity is far from satisfaction. To inspire innovative ideas for boosting the H2O2 yield in photocatalysis, the most well-studied metal oxide photocatalysts are selected and the modification strategies to improve their activity are listed. The mechanisms for H2O2 production over modified photocatalysts are discussed to highlight the facilitating role of the modification methods. Besides, methods for the quantification of H2O2 and associated radical intermediates are provided to guide future studies in this field.

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第 170 条，共 300 条

标题: Analytical solution for distributed torsional low strain integrity test for pipe pile

作者: Zhang, YP (Zhang, Yunpeng); Jiang, GS (Jiang, Guosheng); Wu, WB (Wu, Wenbing); El Naggar, MH (El Naggar, M. Hesham); Liu, H (Liu, Hao); Wen, MJ (Wen, Minjie); Wang, KH (Wang, Kuihua)

来源出版物: INTERNATIONAL JOURNAL FOR NUMERICAL AND ANALYTICAL METHODS IN GEOMECHANICS 卷: 46 期: 1 页: 47-67 DOI: 10.1002/nag.3290 提前访问日期: OCT 2021 出版年: JAN 2022

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摘要: Low strain integrity tests (LSITs) are the most popular non-destructive methods for pile testing. However, traditional LSITs have encountered unprecedented challenges as the need for long pile and existing pile testing keeps multiplying. Compared to traditional longitudinal excitations, the torsional wave is less influenced by the velocity attenuation effect and can be subjected at the pile shaft for existing piles. Distributed torsional LSIT is proposed in this article with the presentation of the corresponding analytical solutions that exhibiting the velocity responses along the pile shaft. The solution is verified with previous simplified theoretical and rigorous finite element method (FEM) answers. At the end, the application of this method is exhibited through the identification of necking and concrete segregation defects on pipe piles, which shows the advantage of this method on long pile testing.

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第 171 条，共 300 条

标题: Defective g-C3N4/covalent organic framework van der Waals heterojunction toward highly efficient S-scheme CO2 photoreduction

作者: Wang, JP (Wang, Jiangpeng); Yu, Y (Yu, Yue); Cui, JY (Cui, Jiayi); Li, XN (Li, Xinran); Zhang, YL (Zhang, Yilin); Wang, C (Wang, Chao); Yu, XL (Yu, Xuelian); Ye, JH (Ye, Jinhua)

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摘要: In this work, a novel van der Waals (vdW) heterojunction composite combining g-C3N4 with nitrogen vacancies and Tp-Tta COF manifests effective interface contact area and excellent photocatalytic CO2 reduction performance. First-principles density functional theory calculation and experimental results suggest that the presence of nitrogen vacancies in g-C3N4 can widen the Fermi level gap between C3N4 (NH) and Tp-Tta COF, promoting the recombination of invalid photogenerated carriers through S-scheme pathway. Benefitted from the accelerated transfer of photogenerated charges at the vdW heterostructure interface, the deactivation of oxygen vacancies in C3N4 (NH)/COF is prevented and much higher photocatalytic activity and stability are obtained. The efficient electron transfer and the affinity of Tp-Tta for CO2 are beneficial to the enhanced CO selectivity. This work provides insights for the design of S-scheme heterojunction photocatalyst for CO2 reduction.

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标题: g-C3N4-Based 2D/2D Composite Heterojunction Photocatalyst

作者: Zhu, BC (Zhu, Bicheng); Cheng, B (Cheng, Bei); Fan, JJ (Fan, Jiajie); Ho, WK (Ho, Wingkei); Yu, JG (Yu, Jiaguo)

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摘要: Employing semiconductor photocatalysis to transform solar energy into chemical energy provides a practicable strategy for the alleviation of energy and environmental crisis. Graphitic carbon nitride (g-C3N4) is a popular 2D photocatalyst with numerous advantages, such as visible light response, low cost, and high stability. However, single g-C3N4 photocatalyst displays poor performance due to fast recombination of photogenerated electrons and holes. To improve this limitation, many research works have focused on the construction of g-C3N4-based 2D/2D heterojunction photocatalysts by hybridizing g-C3N4 with other 2D materials. The intimate face-to-face contact in 2D/2D heterojunction offers large contact area and plentiful channels for the migration and separation of photogenerated charge carriers. Furthermore, 2D/2D heterojunction inherits the strengths of 2D structure, including high specific surface area, abundant adsorption sites and active sites. Herein, the preparation, mechanism, and application of g-C3N4-based 2D/2D heterojunction photocatalysts are reviewed. Three common preparation methods are summarized, including solid phase reaction, in situ growth, and electrostatic self-assembly. Various photocatalytic mechanisms are discussed, including traditional type-II, Z-scheme and S-scheme mechanisms. A series of applications in energy and environment fields are illustrated. Finally, future directions for the development of g-C3N4-based 2D/2D heterojunction photocatalysts are proposed.

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第 173 条，共 300 条

标题: Dual-Single-Atom Tailoring with Bifunctional Integration for High-Performance CO2 Photoreduction

作者: Cheng, L (Cheng, Lei); Yue, XY (Yue, Xiaoyang); Wang, LX (Wang, Linxi); Zhang, DN (Zhang, Dainan); Zhang, P (Zhang, Peng); Fan, JJ (Fan, Jiajie); Xiang, QJ (Xiang, Quanjun)

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摘要: Single-atom photocatalysis has been demonstrated as a novel strategy to promote heterogeneous reactions. There is a diversity of monoatomic metal species with specific functions; however, integrating representative merits into dual-single-atoms and regulating cooperative photocatalysis remain a pressing challenge. For dual-single-atom catalysts, enhanced photocatalytic activity would be realized through integrating bifunctional properties and tuning the synergistic effect. Herein, dual-single-atoms supported on conjugated porous carbon nitride polymer are developed for effective photocatalytic CO2 reduction, featuring the function of cobalt (Co) and ruthenium (Ru). A series of in situ characterizations and theoretical calculations are conducted for quantitative analysis of structure-performance correlation. It is concluded that the active Co sites facilitate dynamic charge transfer, while the Ru sites promote selective CO2 surface-bound interaction during CO2 photoreduction. The combination of atom-specific traits and the synergy between Co and Ru lead to the high photocatalytic CO2 conversion with corresponding apparent quantum efficiency (AQE) of 2.8% at 385 nm, along with a high turnover number (TON) of more than 200 without addition of any sacrificial agent. This work presents an example of identifying the roles of different single-atom metals and regulating the synergy, where the two metals with unique properties collaborate to further boost the photocatalytic performance.

入藏号: WOS:000704496500001

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第 174 条，共 300 条

标题: CsPbBr3 Nanocrystal Induced Bilateral Interface Modification for Efficient Planar Perovskite Solar Cells

作者: Zhang, JJ (Zhang, Jianjun); Wang, LX (Wang, Linxi); Jiang, CH (Jiang, Chenhui); Cheng, B (Cheng, Bei); Chen, T (Chen, Tao); Yu, JG (Yu, Jiaguo)

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摘要: Organic-inorganic halide perovskite solar cells (PSCs) have drawn tremendous attention owing to their remarkable photovoltaic performance and simple preparation process. However, conventional wet-chemical synthesis methods inevitably create defects both in the bulk and at the interfaces of perovskites, leading to recombination of charge carriers and reduced stability. Herein, a bilateral interface modification to perovskites by doping room-temperature synthesized CsPbBr3 nanocrystals (CN) is reported. The ultrafast transient absorption measurement reveals that CN effectively suppresses the defect at the SnO2/perovskite interface and boosts the interfacial electron transport. Meanwhile, the in situ Kelvin probe force microscopy and contact potential difference characterizations verify that the CN within the upper part of the perovskites enhances the built-in electric field, facilitating oriented migration of the carriers within the perovskite. Combining the superiorities of CN modifiers on both sides, the bilaterally modified CH3NH3PbI3-based planar PSCs exhibit optimal power conversion efficiency exceeding 20% and improved device stability.

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标题: In situ Irradiated XPS Investigation on S-Scheme TiO2@ZnIn2S4 Photocatalyst for Efficient Photocatalytic CO2 Reduction

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摘要: Reasonable design of efficient hierarchical photocatalysts has gained significant attention. Herein, a step-scheme (S-scheme) core-shell TiO2@ZnIn2S4 heterojunction is designed for photocatalytic CO2 reduction. The optimized sample exhibits much higher CO2 photoreduction conversion rates (the sum yield of CO, CH3OH, and CH4) than the blank control, i.e., ZnIn2S4 and TiO2. The improved photocatalytic performance can be attributed to the inhibited recombination of photogenerated charge carriers induced by S-scheme heterojunction. The improvement is also attributed to the large specific surface areas and abundant active sites. Meanwhile, S-scheme photogenerated charge transfer mechanism is testified by in situ irradiated X-ray photoelectron spectroscopy, work function calculation, and electron paramagnetic resonance measurements. This work provides an effective strategy for designing highly efficient heterojunction photocatalysts for conversion of solar fuels.

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标题: Recent advances on Bi2WO6-based photocatalysts for environmental and energy applications

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摘要: Bismuth tungstate (Bi2WO6) has become a research hotspot due to its potential in photocatalytic energy conversion and environmental purification. Nevertheless, the limited light absorption and fast recombination of photogenerated carriers hinder the further improvement of the photocatalytic performance of Bi2WO6. Herein, we provide a systematic review for the recent advances on Bi2WO6-based photocatalysts. It starts with the crystal structure, optical properties and photocatalytic fundamentals of Bi2WO6. Then, we focus on the modification strategies of Bi2WO6 based on morphology control, atomic modulation and composite fabrication for diverse photocatalytic applications, such as organic synthesis, water splitting, CO2 reduction, water treatment, air purification, bacterial inactivation, etc. Finally, some current challenges and future development prospects are proposed. We expect that this review can provide a useful reference and guidance for the development of efficient Bi2WO6 photocatalysts. (C) 2021, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. Published by Elsevier B.V. All rights reserved.

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第 177 条，共 300 条

标题: A global observational analysis to understand changes in air quality during exceptionally low anthropogenic emission conditions

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摘要: This global study, which has been coordinated by the World Meteorological Organization Global Atmospheric Watch (WMO/GAW) programme, aims to understand the behaviour of key air pollutant species during the COVID-19 pandemic period of exceptionally low emissions across the globe. We investigated the effects of the differences in both emissions and regional and local meteorology in 2020 compared with the period 2015-2019. By adopting a globally consistent approach, this comprehensive observational analysis focuses on changes in air quality in and around cities across the globe for the following air pollutants PM2.5, PM10, PMC (coarse fraction of PM), NO2, SO2, NOx, CO, O-3 and the total gaseous oxidant (O-X = NO2 + O-3) during the pre-lockdown, partial lockdown, full lockdown and two relaxation periods spanning from January to September 2020. The analysis is based on in situ ground-based air quality observations at over 540 traffic, background and rural stations, from 63 cities and covering 25 countries over seven geographical regions of the world. Anomalies in the air pollutant concentrations (increases or decreases during 2020 periods compared to equivalent 2015-2019 periods) were calculated and the possible effects of meteorological conditions were analysed by computing anomalies from ERA5 reanalyses and local observations for these periods. We observed a positive correlation between the reductions in NO2 and NOx concentrations and peoples' mobility for most cities. A correlation between PMC and mobility changes was also seen for some Asian and South American cities. A clear signal was not observed for other pollutants, suggesting that sources besides vehicular emissions also substantially contributed to the change in air quality.

As a global and regional overview of the changes in ambient concentrations of key air quality species, we observed decreases of up to about 70% in mean NO2 and between 30% and 40% in mean PM2.5 concentrations over 2020 full lockdown compared to the same period in 2015-2019. However, PM2.5 exhibited complex signals, even within the same region, with increases in some Spanish cities, attributed mainly to the long-range transport of African dust and/or biomass burning (corroborated with the analysis of NO2/CO ratio). Some Chinese cities showed similar increases in PM2.5 during the lockdown periods, but in this case, it was likely due to secondary PM formation. Changes in O-3 concentrations were highly heterogeneous, with no overall change or small increases (as in the case of Europe), and positive anomalies of 25% and 30% in East Asia and South America, respectively, with Colombia showing the largest positive anomaly of similar to 70%. The SO2 anomalies were negative for 2020 compared to 2015-2019 (between similar to 25 to 60%) for all regions. For CO, negative anomalies were observed for all regions with the largest decrease for South America of up to similar to 40%. The NO2/CO ratio indicated that specific sites (such as those in Spanish cities) were affected by biomass burning plumes, which outweighed the NO2 decrease due to the general reduction in mobility (ratio of similar to 60%). Analysis of the total oxidant (OX = NO2 + O-3) showed that primary NO2 emissions at urban locations were greater than the O-3 production, whereas at background sites, O-X was mostly driven by the regional contributions rather than local NO2 and O-3 concentrations. The present study clearly highlights the importance of meteorology and episodic contributions (e.g., from dust, domestic, agricultural biomass burning and crop fertilizing) when analysing air quality in and around cities even during large emissions reductions. There is still the need to better understand how the chemical responses of secondary pollutants to emission change under complex meteorological conditions, along with climate change and socio-economic drivers may affect future air quality. The implications for regional and global policies are also significant, as our study clearly indicates that PM2.5 concentrations would not likely meet the World Health Organization guidelines in many parts of the world, despite the drastic reductions in mobility. Consequently, revisions of air quality regulation (e.g., the Gothenburg Protocol) with more ambitious targets that are specific to the different regions of the world may well be required.

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标题: The processing methods of geochemical exploration data: past, present, and future

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摘要: Geochemical exploration data is popular in mineral exploration in that it plays a notable role in discovering unknown mineral deposits. In this study, we review the state-of-the-art popular methods for processing geochemical exploration data and for identifying geochemical anomalies associated with mineralization. The distribution laws of geochemical elements concentrations, including normal, log-normal, power-law, and multimodal and complex distributions, have been extensively studied over the past several decades. Accordingly, methods for processing geochemical exploration data have shifted from classic statistics, multivariate statistics, geostatistics, to fractal/multifractal models and machine learning algorithms. Geochemical exploration data, as compositional data, suffer from the closure problem. We need first to open them using logratio transformation. In the future, deep learning algorithms will become a popular technique for mining geochemical exploration data and for extracting targets associated with mineralization in mineral exploration.

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标题: Deep continental roots and cratons

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摘要: Cratons are the oldest parts of the Earth's continents; this Review concludes that the production of widespread, thick and strong lithosphere via the process of orogenic thickening was fundamental to the eventual emergence of extensive continental landmasses.

The formation and preservation of cratons-the oldest parts of the continents, comprising over 60 per cent of the continental landmass-remains an enduring problem. Key to craton development is how and when the thick strong mantle roots that underlie these regions formed and evolved. Peridotite melting residues forming cratonic lithospheric roots mostly originated via relatively low-pressure melting and were subsequently transported to greater depth by thickening produced by lateral accretion and compression. The longest-lived cratons were assembled during Mesoarchean and Palaeoproterozoic times, creating the stable mantle roots 150 to 250 kilometres thick that are critical to preserving Earth's early continents and central to defining the cratons, although we extend the definition of cratons to include extensive regions of long-stable Mesoproterozoic crust also underpinned by thick lithospheric roots. The production of widespread thick and strong lithosphere via the process of orogenic thickening, possibly in several cycles, was fundamental to the eventual emergence of extensive continental landmasses-the cratons.

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标题: Understanding Spatio-Temporal Patterns of Land Use/Land Cover Change under Urbanization in Wuhan, China, 2000-2019

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摘要: Exploring land use structure and dynamics is critical for urban planning and management. This study attempts to understand the Wuhan development mode since the beginning of the 21st century by profoundly investigating the spatio-temporal patterns of land use/land cover (LULC) change under urbanization in Wuhan, China, from 2000 to 2019, based on continuous time series mapping using Landsat observations with a support vector machine. The results indicated rapid urbanization, with large LULC changes triggered. The built-up area increased by 982.66 km(2) (228%) at the expense of a reduction of 717.14 km(2) (12%) for cropland, which threatens food security to some degree. In addition, the natural habitat shrank to some extent, with reductions of 182.52 km(2), 23.92 km(2) and 64.95 km(2) for water, forest and grassland, respectively. Generally, Wuhan experienced a typical urbanization course that first sped up, then slowed down and then accelerated again, with an obvious internal imbalance between the 13 administrative districts. Hanyang, Hongshan and Dongxihu specifically presented more significant land dynamicity, with Hanyang being the active center. Over the past 19 years, Wuhan mainly developed toward the east and south, with the urban gravity center transferred from the northwest to the southeast of Jiang'an district. Lastly, based on the predicted land allocation of Wuhan in 2029 by the patch-generating land use simulation (PLUS) model, the future landscape dynamic pattern was further explored, and the result shows a rise in the northern suburbs, which provides meaningful guidance for urban planners and managers to promote urban sustainability.

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标题: Efficient and Effective Regularized Incomplete Multi-View Clustering

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摘要: Incomplete multi-view clustering (IMVC) optimally combines multiple pre-specified incomplete views to improve clustering performance. Among various excellent solutions, the recently proposed multiple kernel k-means with incomplete kernels (MKKM-IK) forms a benchmark, which redefines IMVC as a joint optimization problem where the clustering and kernel matrix imputation tasks are alternately performed until convergence. Though demonstrating promising performance in various applications, we observe that the manner of kernel matrix imputation in MKKM-IK would incur intensive computational and storage complexities, over-complicated optimization and limitedly improved clustering performance. In this paper, we first propose an Efficient and Effective Incomplete Multi-view Clustering (EE-IMVC) algorithm to address these issues. Instead of completing the incomplete kernel matrices, EE-IMVC proposes to impute each incomplete base matrix generated by incomplete views with a learned consensus clustering matrix. Moreover, we further improve this algorithm by incorporating prior knowledge to regularize the learned consensus clustering matrix. Two three-step iterative algorithms are carefully developed to solve the resultant optimization problems with linear computational complexity, and their convergence is theoretically proven. After that, we theoretically study the generalization bound of the proposed algorithms. Furthermore, we conduct comprehensive experiments to study the proposed algorithms in terms of clustering accuracy, evolution of the learned consensus clustering matrix and the convergence. As indicated, our algorithms deliver their effectiveness by significantly and consistently outperforming some state-of-the-art ones.

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标题: Robust Load Frequency Control for Power System Considering Transmission Delay and Sampling Period

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摘要: Uncertain transmission delays, sampling periods, parameters uncertainties regarding the power system, load fluctuations, and the intermittent generation of renewable energy sources (RESs) will significantly influence a power system's frequency. This article designs a robust delay-dependent PI-based load frequency control (LFC) scheme for a power system based on sampled-data control. First, a sampled-data-based delay-dependent LFC model of power system is constructed. Then, by applying the Lyapunov theory, and the linear matrix inequality technique, a novel stability criterion is developed for the LFC of the power system by considering the sampling period, and transmission delay of the communication network, which ensures that the proposed scheme operates in large sampling periods, and under transmission delays. Next, an exponential decay rate (EDR) is introduced to guide the design of a robust PI-based LFC scheme. The LFC scheme with robustness is designed by setting a small EDR. The values of EDR are adjusted by the given robust performance evaluation conditions of parameter uncertainties, and H-infinity performance. Finally, case studies are carried out based on a one-area power system, and a three-area power system with RESs. Simulation results show that the proposed LFC scheme performs strong robustness against parameter uncertainties regarding the power system, and communication network, load fluctuations, and the intermittent generation of RESs.

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第 183 条，共 300 条

标题: Air pollution scenario over Pakistan: Characterization and ranking of extremely polluted cities using long-term concentrations of aerosols and trace gases

作者: Bilal, M (Bilal, Muhammad); Mhawish, A (Mhawish, Alaa); Nichol, JE (Nichol, Janet E.); Qiu, ZF (Qiu, Zhongfeng); Nazeer, M (Nazeer, Majid); Ali, MA (Ali, Md Arfan); de Leeuw, G (de Leeuw, Gerrit); Levy, RC (Levy, Robert C.); Wang, Y (Wang, Yu); Chen, Y (Chen, Yang); Wang, LC (Wang, Lunche); Shi, Y (Shi, Yuan); Bleiweiss, MP (Bleiweiss, Max P.); Mazhar, U (Mazhar, Usman); Atique, L (Atique, Luqman); Ke, S (Ke, Song)

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摘要: Pakistan ranks third in the world in terms of mortality attributable to air pollution, with aerosol mass concentrations (PM2.5) consistently well above WHO (World Health Organization) air quality guidelines (AQG). However, regulation is dependent on a sparse network of air quality monitoring stations and insufficient ground data. This study utilizes long-term observations of aerosols and trace gases to characterize and rank the air pollution scenarios and pollution characteristics of 80 selected cities in Pakistan. Datasets used include (1) the Aqua and Terra (AquaTerra) MODIS (Moderate Resolution Imaging Spectmradiometer) Level 2 Collection 6.1 merged Dark Target and Deep Blue (DTB) aerosol optical depth (AOD) retrieval products; (2) the CAMS (Copernicus Atmosphere Monitoring Service) reanalysis PM1, PM2.5, and PM10 data; (3) the MERRA-2 (Modern-Era Retrospective analysis for Research and Applications, Version 2) reanalysis PM2.5 data, (4) the OMI (Ozone Monitoring Instrument) tropospheric vertical column density (TVCD) of nitrogen dioxide (NO2), and VCD of sulfur dioxide (SO2) in the Planetary Boundary Layer (PBL), (5) the VIIRS (Visible Infrared Imaging Radiometer Suite) Nighttime Lights data, (6) MODIS Collection 6 Version 2 global monthly fire location data (MCD14ML), (7) population density, (8) MODIS Level 3 Collection 6 land cover types, (9) AERONET (AErosol RObotic NETwork) Version 3 Level 2.0 data, and (10) ground-based PM2.5 concentrations from air quality monitoring stations. Potential Source Contribution Function (PSCF) analyses were performed by integrating with ground-based PM2.5 concentrations and the NOAA (National Oceanic and Atmospheric Administration) HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) air parcel back trajectories to identify potential pollution source areas which are responsible for extreme air pollution in Pakistan. Results show that the ranking of the top polluted cities depends on the type of pollutant considered and the metric used.For example, Jhang, Multan, and Vehari were characterized as the top three polluted cities in Pakistan when considering AquaTerra DTB AOD products; for PM1, PM2.5, and PM10 Lahore, Gujranwala, and Okara were the top three; for tropospheric NO2 VCD Lahore, Rawalpindi, and Islamabad and for PBL SO2 VCD Lahore, Mirpur, and Gujranwala. The results demonstrate that Pakistan's entire population has been exposed to high PM2.5 concentrations for many years, with a mean annual value of 54.7 mu g/m(3), over all Pakistan from 2003 to 2020.This value exceeds Pakistan's National Environmental Quality Standards (Pak-NEQS, i.e., <15 mu g/m(3) annual mean) for ambient air defined by the Pakistan Environmental Protection Agency (Pak-EPA) as well as the WHO Interim Target-1 (i.e., mean annual PM2.5 < 35 mu g/m(3)).The spatial analyses of the concentrations of aerosols and trace gases in terms of population density, nighttime lights, land cover types, and fire location data, and the PSCF analysis indicate that Pakistan's air quality is strongly affected by anthropogenic sources inside of Pakistan, with contributions from surrounding countries.Statistically significant positive (increasing) trends in PM1, PM2.

5, PM10, tropospheric NO2 VCD, and SO2 VCD were observed in similar to 89%, similar to 67%, similar to 48%, 91%, and similar to 88% of the Pakistani cities (80 cities), respectively.

This comprehensive analysis of aerosol and trace gas levels, their characteristics in spatio-temporal domains, and their trends over Pakistan, is the first of its kind. Results will be helpful to the Ministry of Climate Change (Government of Pakistan), Pak-EPA, SUPARCO (Pakistan Space and Upper Atmosphere Research Commission), policymakers, and the local research community to mitigate air pollution and its effects on human health.

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标题: TiO2/In2S3 S-scheme photocatalyst with enhanced H2O2-production activity

作者: Yang, Y (Yang, Yi); Cheng, B (Cheng, Bei); Yu, JG (Yu, Jiaguo); Wang, LX (Wang, Linxi); Ho, WK (Ho, Wingkei)

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摘要: Photocatalytic production of hydrogen peroxide (H2O2) is an ideal pathway for obtaining solar fuels. Herein, an S-scheme heterojunction is constructed in hybrid TiO2/In2S3 photocatalyst, which greatly promotes the separation of photogenerated carriers to foster efficient H2O2 evolution. These composite photocatalysts show a high H2O2 yield of 376 mu mol/(L center dot h). The mechanism of charge transfer and separation within the S-scheme heterojunction is well studied by computational methods and experiments. Density functional theory and in-situ irradiated X-ray photoelectron spectroscopy results reveal distinct features of the S-scheme heterojunction in the TiO2/In2S3 hybrids and demonstrate charge transfer mechanisms. The density functional theory calculation and electron paramagnetic resonance results suggest that O-2 reduction to H2O2 follows stepwise one-electron processes. In2S3 shows a much stronger interaction with O-2 than TiO2 as well as a higher reduction ability, serving as the active sites for H2O2 generation. The work provides a novel design of S-scheme photocatalyst with high H2O2 evolution efficiency and mechanistically demonstrates the improved separation of charge carriers.

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标题: A review: Synthesis, modification and photocatalytic applications of ZnIn2S4

作者: Wang, J (Wang, Jie); Sun, SJ (Sun, Sijia); Zhou, R (Zhou, Run); Li, YZ (Li, Yangzi); He, ZT (He, Zetian); Ding, H (Ding, Hao); Chen, DM (Chen, Daimei); Ao, WH (Ao, Weihua)

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摘要: Solar energy is an ideal energy source for solving energy shortages and serious environmental problems. In the past few decades, photocatalytic technology which uses solar energy to deal with the above problems has caused great interest. ZnIn2S4, as a layered ternary metal chalcogenide compound, has a series of advantages such as the wide light absorption range and adjustable bandgap. It has been applied in the different fields of photocatalysis in recent years. This review introduced the crystal structures and growth mechanism of ZnIn2S4 and summarized the preparation methods of ZnIn2S4. Also, the promoted strategies of ZnIn2S4 based photocatalytic system and their applications in the pollutant removal, hydrogen evolution, reduction of CO2, nitrogen fixation, and chemical synthesis was summarized. Furthermore, the challenges and development directions of the current ZnIn2S4 based photocatalytic system were proposed. It is hoped that this review will help researchers design a better ZnIn2S4 based photocatalytic system. (C) 2021 Published by Elsevier Ltd on behalf of The editorial office of Journal of Materials Science & Technology.

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标题: Tourmaline composition and boron isotope signature as a tracer of magmatic-hydrothermal processes

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摘要: This study presents a petrogeochemical and boron isotope study on tourmaline from the barren Damai, and the contemporaneous but ore-bearing Dewulu and Meiwu intrusions, to better understand the origins, sources, and fluid evolution of magmatic-hydrothermal ore systems and provide ore formation implications for gold, copper, and iron deposits in the Xiahe-Hezuo polymetallic district in the West Qinling, China. Tourmaline from all three intrusions shows similar compositions and encompasses Na-Fe schorl and Na-Mg dravite. Tourmaline at Dewulu is primarily found in tuffaceous breccias and a quartz diorite porphyry. In the tuffaceous breccia body, tourmaline occurs as fine-grained anhedral masses that fill voids and cement fragments of breccia and sickle quartz. Tourmalines in breccia are texturally similar to those formed in typical breccia pipes, which are attributed to explosion or collapse induced by a transition from magmatic to hydrothermal Si- and B-rich fluids. They display element substitutions controlled by Fe2+Mg-1, indicating a reduced environment. Values of delta B-11 are -6.6 to -4.0 parts per thousand, representing the primary magmatic-hydrothermal fluids. Tourmaline from the Dewulu quartz diorite porphyry is coarse-grained, euhedral, and found in quartz-sulfide veins. The tourmaline displays oscillatory zoning textures but lacks correlative variations of major elements. The Fe2+Mg-1 and Fe3+Al-1 substitution mechanisms are dominant, demonstrating more oxidized fluids. The delta B-11 values in the cores, ranging from -7.1 to -5.6 parts per thousand, suggest that the tourmalines in the quartz veins were inherited from magmatic-hydrothermal fluids that precipitated the fine-grained tourmaline in the tuffaceous breccia body. A large delta B-11 isotopic fractionation that decreases from cores (-5.6 parts per thousand) to rims (-10.7 parts per thousand) indicates significant fractionation during degassing occurred, increasing oxygen fugacity of the residual liquid. The Meiwu locality hosts fine-grained euhedral tourmalines coexisting with magnetite. Their composition is controlled by substitution between Al3+ by Fe3+ and has the lightest delta B-11 values ranging from -11.4 to -10.0 parts per thousand. They are interpreted to result from skarn formation under oxidized conditions. In contrast, (X)rectangle Al(NaMg)(-1) is the dominant substitution mechanism for Damai tourmalines and attributed to (geochemically) reduced fluids with a low salinity. We conclude that tourmalines with low Fe values, substitution mechanisms dominated by Fe3+Al-1, and large shifts of B isotopic composition are potentially an ore-forming indicator in the Xiahe-Hezuo polymetallic district.

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标题: Understanding trade-offs and synergies of ecosystem services to support the decision-making in the Beijing?Tianjin?Hebei region

作者: Feng, Z (Feng, Zhe); Jin, XR (Jin, Xueru); Chen, TQ (Chen, Tianqian); Wu, JS (Wu, Jiansheng)

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摘要: Understanding ecosystem service trade-offs and synergies is the foundation to achieve the efficient management of the ecosystem and improve human well-being. However, the current research involving the driving mechanism of ecosystem service relationship formation is still limited. In this paper, a semi-quantitative model named Bayesian belief networks is introduced to simulate ecological processes, which links the potential influencing factors with the ecosystem service supply. The purpose of this paper is to help understand the ecosystem service relationship and provide management decision-making reference. Taking the Beijing?Tianjin?Hebei region as a study area, four ecosystem services (habitat quality, carbon storage, water yield, and soil retention services) were quantified and mapped in 2015. Based on a created Bayesian belief network simulating the ecosystem service supply, the sensitivity analysis was used to identify the key factors affecting the ecosystem service supply. Besides, the relationship between ecosystem services was identified and the driving mechanism was analyzed through the Bayesian probabilistic inference. The main conclusions demonstrate the following. (1) The spatial heterogeneity of the ecosystem service supply in the Beijing?Tianjin?Hebei region is relatively strong. (2) The key factors affecting ecosystem services are the land use type, vegetation coverage, precipitation, slope, evapotranspiration, and population density. (3) Habitat quality, carbon storage, and soil retention services synergize one another, and there are trade-offs between water yield service and habitat quality, carbon storage, and soil retention services, respectively. (4) Among the land use type, vegetation coverage, slope, and population density, the land use type has the most important impact on ecosystem service trade-offs. As a practice of combining Bayesian belief networks and ecosystem services, this study can contribute to a research method of ecosystem service relationships and references for the management decision-making on maximizing the overall benefits of ecosystem services.

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标题: Identifying the impacts of natural and human factors on ecosystem service in the Yangtze and Yellow River Basins

作者: Fang, LL (Fang, Lulu); Wang, LC (Wang, Lunche); Chen, WX (Chen, Wanxu); Sun, J (Sun, Jia); Cao, Q (Cao, Qian); Wang, SQ (Wang, Shaoqiang); Wang, LZ (Wang, Lizhe)

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摘要: The Yangtze River Basin (YZRB) and Yellow River Basin (YRB) are important ecological regions in China. In recent decades, intense climate change and human activities have altered the natural landscapes of both basins and degraded their ecosystem functions. This study focused on clarifying the major factors influencing the ecosystem services (ESs) in different regions of China, which will be key to manage ecosystems sustainably. Five ESs, including water yield, carbon storage, soil conservation, water purification and habitat quality were selected for mapping. The geographical detector model was used to analyze the independent and joint effects of driving factors, and the spatial changes in driving factors were expressed using geographically weighted regression model. Results showed that (1) all five ESs decreased from southeast to northwest in the YRB but had an irregular distribution in the YZRB. (2) Precipitation and woodland proportion were dominant factors for total ecosystem services in both basins, followed by temperature, slope, and human activity intensity in the YRB, and temperature, human activity intensity, and population density in the YZRB. The combined effects of the driving factors were much higher than the individual effects in both basins (3) Natural factors (e.g., precipitation, slope, and woodland proportion). exerted positive effects in most areas of both basins. Human factors (e.g., GDP, human activity intensity, and built-up land proportion) had negative effects, with an uneven spatial distribution. Overall, natural factors promoted the formation and spatial distribution of ESs, and their direct impacts on total ecosystem services were insignificant in the short term. The impact of land-use changes played a leading role in joint impacts. In the YRB, the increase of woodland had a positive effect on ESs; the continuous growth of buildup land led to the degradation of ESs in the YZRB. Accordingly, adhering to the program of Grain for Green and changing the mode of economic development are crucial for future development. A comparative analysis of the driving factors of ESs in different regions provides a scientific basis for understanding and optimizing management policies.

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第 189 条，共 300 条

标题: 2D Graphitic Carbon Nitride for Energy Conversion and Storage

作者: Wang, YH (Wang, Yinghui); Liu, LZ (Liu, Lizhen); Ma, TY (Ma, Tianyi); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

来源出版物: ADVANCED FUNCTIONAL MATERIALS 卷: 31 期: 34 文献号: 2102540 DOI: 10.1002/adfm.202102540 提前访问日期: JUN 2021 出版年: AUG 2021

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摘要: Graphitic carbon nitride (g-C3N4) have attracted great attention in the field of energy conversion and storage due to its unique layered structure, tunable bandgap, metal-free characteristic, high physicochemical stability, and easy accessibility. 2D g-C3N4 nanosheets have the features of short charge/mass transfer path, abundant reactive sites and easy functionalization, which are beneficial to optimizing their performance in different fields. However, the reviews of the comprehensive applications of 2D g-C3N4 for energy conversion and storage are rare. Herein, this review first introduces the physicochemical properties of bulk g-C3N4 and g-C3N4 nanosheets, and then summarizes the synthetic strategies of 2D g-C3N4 nanosheets in detail, such as thermal oxidation etching, chemical exfoliation, ultrasonication-assisted liquid phase exfoliation, chemical vapor deposition, and others. Emphasis is focused on the rational design and development of 2D g-C3N4 nanosheets for the diversified applications in energy conversion and storage, including photocatalytic H-2 evolution, CO2 reduction, electrocatalytic H-2 evolution, O-2 evolution, O-2 reduction, alkali-metal ion batteries, lithium-metal batteries, lithium-sulfur batteries, metal-air batteries, and supercapacitors. Finally, the current challenges and perspectives of 2D g-C3N4 nanosheets for energy conversion and storage applications are discussed.

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第 190 条，共 300 条

标题: Study the effect of industrial structure optimization on urban land-use efficiency in China

作者: Liu, JM (Liu, Jingming); Hou, XH (Hou, Xianhui); Wang, ZQ (Wang, Zhanqi); Shen, Y (Shen, Yue)

来源出版物: LAND USE POLICY 卷: 105 文献号: 105390 DOI: 10.1016/j.landusepol.2021.105390 出版年: JUN 2021

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摘要: Optimizing industrial structure plays an important role in changing urban land use structure and redistributing land resources among various industrial sectors, further impacting urban land-use efficiency (ULUE) and ensuring sustainable development of local industries. In this paper, we adopted the panel data of 31 provinces in China from 2000 to 2015 as case studies, and included spatially lagged dependent variable, spatially lagged exogenous variables and quadratic terms by combining the STIRPAT model with the spatial Dubin Model (SDM) together to reflect the time-lagged effects, pace-based correlation, and embedded complex nonlinearity relationship between industrial structure optimization (ISO) and ULUE separately. Leveraging such design, we first accessed the value of ULUE and ISO separately by provinces, and found interesting patterns in time and space. Temporally, the value of industrial structure upgrading (ISU) and ULUE increased gradually during 2000?2015, while the value of industrial structure rationalization (ISR) first decreased and then increased over that period. Spatially, ISU showed a strong geographical aggregation than ISR, the distribution of ULUE showed a ?T? pattern from eastern to west in 2015. Then, we analyzed the effect of ISO on ULUE from three aspects, urban land structure efficiency, scale efficiency and intensive efficiency separately. Results show that the relationship between ULUE and ISO delineated as ?U-shaped curve?. Among these, ISU has the greatest impact on land structural efficiency, followed by intensive efficiency, while ISR showed a U-shape distribution between structure efficiency and scale efficiency, but a reciprocal U-shape with the intensive efficiency. Moreover, the value of ULUE was affected by its pervious value, and the spillover effect of ISU stimulated the growth of local ULUE, but the ISR in the near province hindered the improvement of local ULUE. For the long-term development, it is necessary for the local government to make full use of their competitive advantages to attract more high-tech and low-consumption industries, and encourage a diversified industrial chain to speed up the agglomeration of factors in production. And it is also important to establish the coordination and interaction mechanism between west and east regions to achieve the dual objectives for ISO and ULUE promotion in China.

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第 191 条，共 300 条

标题: Pt/Fe2O3 with Pt-Fe pair sites as a catalyst for oxygen reduction with ultralow Pt loading

作者: Gao, RJ (Gao, Ruijie); Wang, J (Wang, Jian); Huang, ZF (Huang, Zhen-Feng); Zhang, RR (Zhang, Rongrong); Wang, W (Wang, Wei); Pan, L (Pan, Lun); Zhang, JF (Zhang, Junfeng); Zhu, WK (Zhu, Weikang); Zhang, XW (Zhang, Xiangwen); Shi, CX (Shi, Chengxiang); Lim, J (Lim, Jongwoo); Zou, JJ (Zou, Ji-Jun)

来源出版物: NATURE ENERGY 卷: 6 期: 6 页: 614-623 DOI: 10.1038/s41560-021-00826-5 提前访问日期: MAY 2021 出版年: JUN 2021

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摘要: Atomically dispersed platinum electrocatalysts for oxygen reduction promise minimized platinum usage, but catalytic activity and selectivity are often low due to unfavourable O-2 adsorption. To circumvent this issue, Gao and colleagues load platinum onto alpha-Fe2O3, making a highly active and stable catalyst with dispersed Pt-Fe pair sites.

Platinum is the archetypal electrocatalyst for oxygen reduction-a key reaction in fuel cells and zinc-air batteries. Although dispersing platinum as single atoms on a support is a promising way to minimize the amount required, catalytic activity and selectivity are often low due to unfavourable O-2 adsorption. Here we load platinum onto alpha-Fe2O3 to construct a highly active and stable catalyst with dispersed Pt-Fe pair sites. We propose that the Pt-Fe pair sites have partially occupied orbitals driven by strong electronic coupling, and can cooperatively adsorb O-2 and dissociate the O=O bond, whereas OH\* can desorb from the platinum site. In alkaline conditions, the catalyst exhibits onset and half-wave potentials of 1.15 V and 1.05 V (versus the reversible hydrogen electrode), respectively, mass activity of 14.9 A mg(Pt)(-1) (at 0.95 V) and negligible activity decay after 50,000 cycles. It also shows better performance than 20% Pt/C in a zinc-air battery and H-2-O-2 fuel cell in terms of specific energy density and platinum utilization efficiency.

入藏号: WOS:000652456000003

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第 192 条，共 300 条

标题: Simultaneous Broadening and Enhancement of Cr3+ Photoluminescence in LiIn2SbO6 by Chemical Unit Cosubstitution: Night-Vision and Near-Infrared Spectroscopy Detection Applications

作者: Liu, DJ (Liu, Dongjie); Li, GG (Li, Guogang); Dang, PP (Dang, Peipei); Zhang, QQ (Zhang, Qianqian); Wei, Y (Wei, Yi); Lian, HZ (Lian, Hongzhou); Shang, MM (Shang, Mengmeng); Lin, CC (Lin, Chun Che); Lin, J (Lin, Jun)

来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 60 期: 26 页: 14644-14649 DOI: 10.1002/anie.202103612 提前访问日期: MAY 2021 出版年: JUN 21 2021

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摘要: Near-infrared (NIR)-emitting phosphor materials have been extensively developed for optoelectronic and biomedical applications. Although Cr3+-activated phosphors have been widely reported, it is challenging to achieve ultra-broad and tunable NIR emission. Here, a new ultra-broadband NIR-emitting LiIn2SbO6:Cr3+ phosphor with emission peak at 965 nm and a full-width at half maximum of 217 nm is reported. Controllable emission tuning from 965 to 892 nm is achieved by chemical unit cosubstitution of [Zn2+-Zn2+] for [Li+-In3+], which can be ascribed to the upshift of T-4(2g) energy level due to the strengthened crystal field. Moreover, the emission is greatly enhanced, and the FWHM reaches 235 nm. The as-prepared luminescent tunable NIR-emitting phosphors have demonstrated the potential in night-vision and NIR spectroscopy techniques. This work proves the feasibility of chemical unit cosubstitution strategy in emission tuning of Cr3+-doped phosphors, which can stimulate further studies on the emission-tunable NIR-emitting phosphor materials.

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第 193 条，共 300 条

标题: Exceptional Cocatalyst-Free Photo-Enhanced Piezocatalytic Hydrogen Evolution of Carbon Nitride Nanosheets from Strong In-Plane Polarization

作者: Hu, C (Hu, Cheng); Chen, F (Chen, Fang); Wang, YG (Wang, Yonggang); Tian, N (Tian, Na); Ma, TY (Ma, Tianyi); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

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摘要: Utilizing mechanical energy to produce hydrogen is emerging as a promising way to generate renewable energy, but is challenged by low efficiency and scanty cognition. In this work, graphitic carbon nitride (g-C3N4) with an atomically thin sheet-like structure is applied for prominent piezocatalytic and photo-enhanced piezocatalytic H-2 production. It is revealed that the anomalous piezoelectricity in g-C3N4 originates from the strong in-plane polarization along the a-axis, contributed by the superimposed polar tri-s-triazine units and flexoelectric effect derived from the structured triangular cavities, which provides powerful electrochemical driving force for the water reduction reaction. Furthermore, the photo-enhanced charge transfer enables g-C3N4 nanosheets to reserve more energized polarization charges to fully participate in the reaction at the surface reactive sites enriched by strain-induced carbon vacancies. Without any cocatalysts, an exceptional photo-piezocatalytic H-2 evolution rate of 12.16 mmol g(-1) h(-1) is delivered by the g-C3N4 nanosheets, far exceeding that of previously reported piezocatalysts and g-C3N4 photocatalysts. Further, high pure-water-splitting performance with production of the value-added oxidation product H2O2 via photo-piezocatalysis is also disclosed. This work not only exposes the potential of g-C3N4 as a piezo-semiconductor for catalytic H-2 evolution, but also breaks a new ground for the conversion of solar and mechanical energy by photomediated piezocatalytic reaction.

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第 194 条，共 300 条

标题: Recognition of a Middle-Late Jurassic arc-related porphyry copper belt along the southeast China coast: Geological characteristics and metallogenic implications

作者: Mao, JW (Mao, Jingwen); Zheng, W (Zheng, Wei); Xie, GQ (Xie, Guiqing); Lehmann, B (Lehmann, Bernd); Goldfarb, R (Goldfarb, Richard)

来源出版物: GEOLOGY 卷: 49 期: 5 页: 592-596 DOI: 10.1130/G48615.1 出版年: MAY 1 2021

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摘要: Recent exploration has led to definition of a Middle-Late Jurassic copper belt with an extent of similar to 2000 km along the southeast China coast. The 171-153 Ma magmatic-hydrothermal copper systems consist of porphyry, skarn, and vein-style deposits. These systems developed along several northeast-trending transpressive fault zones formed at the margins of Jurassic volcanic basins, although the world-class 171 Ma Dexing porphyry copper system was controlled by a major reactivated Neoproterozoic suture zone in the South China block. The southeast China coastal porphyry belt is parallel to the northeast-trending, temporally overlapping, 165-150 Ma tin-tungsten province, which developed in the Nanling region in a back-arc transtensional setting several hundred kilometers inboard. A new geodynamicmetallogenic model linking the two parallel belts is proposed, which is similar to that characterizing the Cenozoic metallogenic evolution of the Central Andes.

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第 195 条，共 300 条

标题: Arsenic contamination of groundwater: A global synopsis with focus on the Indian Peninsula

作者: Shaji, E (Shaji, E.); Santosh, M (Santosh, M.); Sarath, KV (Sarath, K., V); Prakash, P (Prakash, Pranav); Deepchand, V (Deepchand, V); Divya, BV (Divya, B., V)

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摘要: More than 2.5 billion people on the globe rely on groundwater for drinking and providing high-quality drinking water has become one of the major challenges of human society. Although groundwater is considered as safe, high concentrations of heavy metals like arsenic (As) can pose potential human health concerns and hazards. In this paper, we present an overviewof the current scenario of arsenic contamination of groundwater in various countries across the globe with an emphasis on the Indian Peninsula. With several newly affected regions reported during the last decade, a significant increase has been observed in the global scenario of arsenic contamination. It is estimated that nearly 108 countries are affected by arsenic contamination in groundwater (with concentration beyond maximum permissible limit of 10 ppb recommended by theWorld Health Organization. The highest among these are from Asia (32) and Europe (31), followed by regions like Africa (20), North America (11), South America (9) and Australia (4). More than 230 million people worldwide, which include 180 million from Asia, are at risk of arsenic poisoning. Southeast Asian countries, Bangladesh, India, Pakistan, China, Nepal, Vietnam, Burma, Thailand and Cambodia, are the most affected. In India, 20 states and 4 Union Territories have so far been affected by arsenic contamination in groundwater. An attempt to evaluate the correlation between arsenic poisoning and aquifer type shows that the groundwater extracted from unconsolidated sedimentary aquifers, particularly those which are located within the younger orogenic belts of the world, are theworst affected. More than 90% of arsenic pollution is inferred to be geogenic. We infer that alluvial sediments are the major source for arsenic contamination in groundwater andwe postulate a strong relation with plate tectonic processes, mountain building, erosion and sedimentation. Prolonged consumption of arsenic-contaminated groundwater results in severe health issues like skin, lung, kidney and bladder cancer; coronary heart disease; bronchiectasis; hyperkeratosis and arsenicosis. Since the major source of arsenic in groundwater is of geogenic origin, the extend of pollution is complexly linked with aquifer geometry and aquifer properties of a region. Therefore, remedialmeasures are to be designed based on the sourcemineral, climatological and hydrogeological scenario of the affected region. The corrective measures available include removing arsenic from groundwater using filters, exploring deeper or alternative aquifers, treatment of the aquifer itself, dilutionmethod by artificial recharge to groundwater, conjunctive use, and installation of nano-filter, among other procedures. The vastmajority of people affected by arsenic contamination in the Asian countries are the poor who live in rural areas and are not aware of the arsenic poisoning and treatment protocols. Therefore, creating awareness and providing proper medical care to these people remain as a great challenge. Very few policy actions have been taken at international level over the past decade to reduce arsenic contamination in drinking water, with the goal of preventing toxic impacts on human health. We recommend that that United Nations Environment Programme (UNEP) andWHO should take stock of the global arsenic poisoning situation and launch a global drive to create awareness among people/medical professionals/health workers/administrators on this global concern. (C) 2021 ChinaUniversity of Geosciences (Beijing) and Peking University.

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第 196 条，共 300 条

标题: Long-Term (1979-Present) Total Water Storage Anomalies Over the Global Land Derived by Reconstructing GRACE Data

作者: Li, FP (Li, Fupeng); Kusche, J (Kusche, Juergen); Chao, NF (Chao, Nengfang); Wang, ZT (Wang, Zhengtao); Locher, A (Loecher, Anno)

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摘要: The Gravity Recovery and Climate Experiment (GRACE) mission has monitored global total water storage anomalies (TWSA) with an unprecedented accuracy since 2002. Yet, many applications require a longer record, that is, extending prior to the GRACE period. Here, we present a new global reconstruction of long-term (1979-2020) TWSA fields by combining machine learning with time series decomposition and statistical decomposition techniques. We find that the long-term TWSA reconstructed from GRACE fits well with the GRACE-FO observation over most grids (0.5 degrees resolution) of the global land and successfully reproduces the strong El Nino signal. Comparisons to Satellite Laser Ranging solutions and to observed global mean sea level change suggest our reconstruction (doi:https://doi.org/10.5061/dryad.z612jm6bt ) is more reliable than previously published products. This study provides a viable approach for both reconstructing past TWSA and filling the GRACE data gap at the global scale.

Plain Language Summary Since 2002, temporal changes of vertically integrated water storage have been detected globally with unprecedented accuracy via satellite gravimetry, as first implemented with the Gravity Recovery and Climate Experiment (GRACE) satellites. However, no similar observation system has been in place before 2002, that could have used to measure the total water storage anomalies (TWSA) with an accuracy comparable to GRACE. Several approaches, such as machine learning, have been proposed in previous studies to reconstruct past TWSA based on their empirical relationships with the climatic/hydrological drivers (e.g., precipitation and soil moisture). Different from traditional approaches, we here combine machine learning with statistical decomposition techniques to reconstruct GRACE-like TWSA (0.5 degrees resolution) for the period 1979-2020 over the global land. We find that the reconstructed TWSA shows strong abnormal signals during El Nino years. In addition, we compare our reconstruction to recent TWSA data obtained using Satellite Laser Ranging analysis to five satellites, that is, Lageos-1, Lageos-2, Ajisai, Stella, and Starlette, in the period since 1993, and to the observed global mean sea level change as validations. The comparison suggests that our reconstruction is more accurate than previously published products. We suggest our method provides a viable alternative for reconstructing long-term TWSA.

入藏号: WOS:000672324900094

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第 197 条，共 300 条

标题: Improving Image-Guided Surgical and Immunological Tumor Treatment Efficacy by Photothermal and Photodynamic Therapies Based on a Multifunctional NIR AIEgen

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摘要: Multimodal therapy is attracting increasing attention to improve tumor treatment efficacy, but generally requires various complicated ingredients combined within one theranostic system to achieve multiple functions. Herein, a multifunctional theranostic nanoplatform based on a single aggregation-induced-emission luminogen (AIEgen), DDTB, is designed to integrate near-infrared (NIR) fluorescence, photothermal, photodynamic, and immunological effects. Intravenously injected AIEgen-based nanoparticles can efficiently accumulate in tumors with NIR fluorescence to provide preoperative diagnosis. Most of the tumors are excised under intraoperative fluorescence navigation, whereafter, some microscopic residual tumors are completely ablated by photodynamic and photothermal therapies for maximally killing the tumor cells and tissues. Up to 90% of the survival rate can be achieved by this synergistic image-guided surgery and photodynamic and photothermal therapies. Importantly, the nanoparticles-mediated photothermal/photodynamic therapy plus programmed death-ligand 1 antibody significantly induce tumor elimination by enhancing the effect of immunotherapy. This theranostic strategy on the basis of a single AIEgen significantly improves the survival of cancer mice with maximized therapeutic outcomes, and holds great promise for clinical cancer treatment.

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第 198 条，共 300 条

标题: MXene as emerging nanofillers for high-performance polymer composites: A review

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摘要: MXenes, transition metal carbide and nitrides with graphene-like structures, have received numerous attention since they were synthesized from MAX phases in 2011. As a rising star in 2D material family, MXenes exhibit charming physical and chemical properties. The superiority in 2D flak structure, combined with rich functional groups, endows MXenes abundant tunable performance and also makes them show unique advantages in various fields. Furthermore, the special structural and functional features also make MXenes and MXene-based materials easy to combine with polymer matrices to meet its high-performance requirements in electrical, thermal, mechanical and other fields. Now, a variety of synthetic methods of MXenes have been explored to suit different application, from hydrofluoric acid to fluorinate-containing acid solution and fluorinate-containing salts. Moreover, diverse modification methods were studied based on abundant terminations of MXene, which are also reviewed. In addition, the fabrication method and performances of MXene/polymer composites are also invested to explore the influence of MXenes on the properties of composite materials. Subsequently, the applications of MXene-based polymeric composites with different properties were also reviewed to explore their application prospects. Lastly, based on current development situation of MXenes, the challenges and prospects for the development of MXene/polymer composites are discussed. In view of the splendid performance of MXenes, obviously, it is certain that MXenes would play a vital role in polymer composites and bring considerable prospects for the development of high-performance composite materials.

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第 199 条，共 300 条

标题: Predicting flood susceptibility using LSTM neural networks

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来源出版物: JOURNAL OF HYDROLOGY 卷: 594 文献号: 125734 DOI: 10.1016/j.jhydrol.2020.125734 提前访问日期: APR 2021 出版年: MAR 2021

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摘要: Identifying floods and producing flood susceptibility maps are crucial steps for decision-makers to prevent and manage disasters. Plenty of studies have used machine learning models to produce reliable susceptibility maps. Nevertheless, most research ignores the importance of developing appropriate feature engineering methods. In this study, we propose a local spatial sequential long short-term memory neural network (LSS-LSTM) for flood susceptibility prediction in Shangyou County, China. The three main contributions of this study are summarized below. First of all, it is a new perspective to use the deep learning technique of LSTM for flood susceptibility prediction. Second, we integrate an appropriate feature engineering method with LSTM to predict flood susceptibility. Third, we implement two optimization techniques of data augmentation and batch normalization to further improve the performance of the proposed method. The LSS-LSTM method can not only capture the attribution information of flood conditioning factors and the local spatial information of flood data, but also has powerful sequential modelling capabilities to deal with the spatial relationship of floods. The experimental results demonstrate that the LSS-LSTM method achieves satisfactory prediction performance (93.75% and 0.965) in terms of accuracy and area under the receiver operating characteristic (ROC) curve.

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标题: Control Performance Standards-Oriented Event-Triggered Load Frequency Control for Power Systems Under Limited Communication Bandwidth

作者: Shangguan, XC (Shangguan, Xing-Chen); He, Y (He, Yong); Zhang, CK (Zhang, Chuan-Ke); Jin, L (Jin, Li); Yao, W (Yao, Wei); Jiang, L (Jiang, Lin); Wu, M (Wu, Min)

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摘要: Load frequency control (LFC) of modern power systems tends to employ open communication networks to transmit measurement/control signals. Under a limited network bandwidth, the continuous and high-sampling-rate signal transmission will be prone to degradation of the LFC performance through network congestion. This brief proposes a decentralized control performance standards (CPSs)-oriented event-triggered (ET) LFC scheme for power systems under constrained communication bandwidth. The proposed scheme comprises the ET LFC scheme and the CPSs-oriented regulation scheme. In the CPSs-oriented regulation scheme, regulation rules are designed to adjust the threshold parameter of the ET LFC scheme based on the North American Electrical Reliability Council (NERC)'s CPS1 and CPS2. The rules generate a larger threshold parameter to lower the triggering frequency in order to reduce unnecessary transmission of measurement/control signals, while ensuring the frequency and tie-lie power of the power systems to meet the required CPS1 and CPS2 instead of the asymptotic stability requirement in the existing research. The reduced transmission of these signals lessens the communication burden. In addition, the decentralized control strategy is used to solve the problems of poor large scalability and computational dimension caused by the centralized control strategy. The effectiveness of the proposed scheme is evaluated on an IEEE 39-bus test system with renewable energy sources.

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第 201 条，共 300 条

标题: Implications of the in situ stress distribution for coalbed methane zonation and hydraulic fracturing in multiple seams, western Guizhou, China

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来源出版物: JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING 卷: 204 文献号: 108755 DOI: 10.1016/j.petrol.2021.108755 提前访问日期: APR 2021 出版年: SEP 2021

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摘要: With 59 sets of well testing data from 32 wells, 70 coal seam gas data from 9 wells, and production data from 17 wells, the in situ stress distribution within depths of 136-1244 m and its implications for coal permeability (0.0001-1.56 mD), gas content (5-22 m3/t) and gas productivity in western Guizhou were investigated. Three major depth intervals with different stress regimes were identified. At depths of 800-1244 m, the horizontal stresses increased to high values with depth due to the compressional zone near the axis of the syncline. Permeability changes with depth were consistent with the effective stress variations. The 500-800 m depth interval with a normal faulting stress regime was favorable for good permeability (0.008-0.57 mD, mean 0.2 mD) and a stable pressure gradient (approximately 1 MPa/100 m), and the gas content generally increased with depth to a peak value at 800 m. For the 200-500 m and 800-1244 m depth intervals, extremely low permeability (0.0001-0.17 mD, mean 0.03 mD) resulted in discontinuous changes in gas content and pressure gradient (0.471.71 MPa/100 m). Overall, the stress release zone at depths of 500-800 m was favorable for coalbed methane extraction, which agreed with the measured production data. Low horizontal stress anisotropy in western Guizhou contributes to complex hydraulic fracture networks, individual seam fracturing with low proppant concentration and high fracturing fluid volume is suggested for multilayer commingled production.

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第 202 条，共 300 条

标题: A Global Context-aware and Batch-independent Network for road extraction from VHR satellite imagery

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来源出版物: ISPRS JOURNAL OF PHOTOGRAMMETRY AND REMOTE SENSING 卷: 175 页: 353-365 DOI: 10.1016/j.isprsjprs.2021.03.016 提前访问日期: APR 2021 出版年: MAY 2021

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摘要: Road extraction is to automatically label the pixels of roads in satellite imagery with specific semantic categories based on the extraction of the topographical meaningful features. For governments, timely and accurate road mapping is crucial to plan infrastructure development and mobilize relief around the world. Recent advances in deep learning have shown their dominance on road extraction from very high-resolution (VHR) satellite imagery. However, previous road extraction based on deep learning mainly stacked the multiple convolution operators and failed to predict the contextual spatial relationship correctly. Besides, the precision of cross-domain road extraction is limited by an insufficient amount of labeled data and the transferability of the model. To remedy these issues, a Global Context-aware and Batch-independent Network (GCB-Net) is proposed, which is a novel road extraction framework extract complete and continuous road networks. In GCB-Net, the Global Context-Aware (GCA) block is added to the encoder-decoder structure to effectively integrate global context features. The Filter Response Normalization (FRN) layer is used to enhance the original basic network, which eliminates the batch dependency to accelerate learning and further improve the robustness of the model. Experimental results on two diverse road extraction data sets demonstrated that the proposed method outperformed the stateof-the-art methods both quantity and quality. Moreover, to test the robust generalizability of the proposed method, the proposed CHN6-CUG Roads Dataset was used for spatial transfer evaluation, and GCB-Net achieved significantly higher transferability than other methods.

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第 203 条，共 300 条

标题: High Performance Composite Polymer Electrolytes for Lithium-Ion Batteries

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摘要: Today, there is an urgent demand to develop all solid-state lithium-ion batteries (LIBs) with a high energy density and a high degree of safety. The core technology in solid-state batteries is a solid-state electrolyte, which determines the performance of the battery. Among all the developed solid electrolytes, composite polymer electrolytes (CPEs) have been deemed as one of the most viable candidates because of their comprehensive performance. In this review, the limitations of traditional solid polymer electrolytes and the recent progress of CPEs are introduced. The effect and mechanism of inorganic fillers to the various properties of electrolytes are discussed in detail. Meanwhile, the factors affecting ionic conductivity are intensively reviewed. The recent representative CPEs with synthetic fillers and natural clay-based fillers are highlighted because of their great potential. Finally, the remaining challenges and promising prospects are outlined to provide strategies to develop novel CPEs for high-performance LIBs.

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第 204 条，共 300 条

标题: Tectono-thermal evolution of the Qilian orogenic system: Tracing the subduction, accretion and closure of the Proto-Tethys Ocean

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摘要: The Qilian orogenic system in the northern Tibetan Plateau records the complete tectonic cycle from opening of Proto-Tethys Ocean, initial subduction, to continental subduction and collision, and extensional collapse during Neoproterozoic to Devonian. Based on a compilation of recently published high-quality data, this contribution provides an overview of the composition, distribution, nature and ages of the principal tectonic elements, including ophiolites, multiple magmatic rocks, as well as high-grade metamorphism and anatexis, with a view to trace the tectonic evolution of the Qilian orogenic system with respect to the opening, subduction, accretion and closure of Proto-Tethys Ocean. Three main suture zones resulting from amalgamation involving microcontinental blocks within the Proto-Tethys Ocean are identified in the Qilian orogenic system, including the North Qilian subduction-accretion suture (NQLS), South Qilian subduction-accretion suture (SQLS) and North Qaidam subduction-collision zone (NQDS) from north to south that sandwich the Alxa, Qilian, Oulongbuluke and Qaidam Blocks. Two contrasting types of convergent orogeny in the Early Paleozoic includes the accretionary orogeny between Alxa, Qilian and Oulongbuluke Blocks (NQLS and SQLS), and the collisional orogeny between the Oulongbuluke Block and Qaidam Block (NQDS).

Both Mariana-type and Andean-type subduction systems were identified in the NQLS based on the occurrence of Early Paleozoic accretionary complexes, ophiolites, high-pressure/low temperature metamorphic rocks and arc-related volcanic rocks and intrusions. The northward subduction beneath a Mariana-type intraoceanic subduction system is represented by the Cambrian-Ordovician island-arc related volcanic rocks, backarc volcanic rocks and ophiolite complex, and the southward subduction of the Proto-Tethys North Qilian Ocean beneath the Qilian Block generated an Andean-type continental arc, characterized by coeval arc magmatism and high-temperature metamorphism. Although oceanic subduction-related high-pressure metamorphism has not yet been recognized, the SQLS is also a typical accretionary orogen composed of island arc rocks, back-arc magmatic assemblages, ophiolite and accretionary complexes. The NQDS is a typical collisional orogen, characterized by ultrahigh pressure pelitic/granitic gneisses intercalated with minor eclogites and garnet peridotite blocks, although the previous subduction of oceanic crust can not yet be precluded, supported by the existence oceanic-type eclogite and arc-related magmatism and high-temperature metamorphism.

Integrating the geological, petrological, geochemical and geochronological evidence, we reconstruct the Neoproterozoic-Paleozoic tectonic history of the Qilian orogenic system with respect to Proto-Tethys Ocean, which includes opening of the Proto-Tethys Qilian Ocean (580-550 Ma), subduction (520-460 Ma), and closure with subsequent deep continental subduction (455-430 Ma), and multi-stage exhumation of deeply subducted continental slab (425-400 Ma), as well as final extensional collapse (400-360 Ma)

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标题: Recycled volatiles determine fertility of porphyry deposits in collisional settings

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摘要: An intensive study of the geochemical characteristics (including the volatile elements Cl and S) of apatite associated with porphyry deposits was undertaken to address the debate about the crust- or mantle-derivation of their copper and gold and to better understand the controls on the transport of metals in magmatic fluids in post-subduction settings. New geochemical data on apatite reveal parameters to discriminate mineralized porphyry systems across Iran and western China (Tibet and Yunnan), from coeval barren localities across this post-subduction metallogenic belt. Apatites in fertile porphyries have higher Cl and S concentrations (reflecting water-rich crystallization conditions) than those from coeval barren ones. Our new isotopic data also indicate these volatiles are likely derived from pre-enriched sub-continental lithospheric mantle, metasomatized by previous oceanic subduction. This study demonstrates that refertilization of suprasubduction lithospheric mantle during previous collision events is a prerequisite for forming post-subduction fertile porphyries, providing an evidence-based alternative to current ore-enrichment models.

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第 206 条，共 300 条

标题: Oxygen Vacant Semiconductor Photocatalysts

作者: Hao, L (Hao, Lin); Huang, HW (Huang, Hongwei); Zhang, YH (Zhang, Yihe); Ma, TY (Ma, Tianyi)

来源出版物: ADVANCED FUNCTIONAL MATERIALS 卷: 31 期: 25 文献号: 2100919 DOI: 10.1002/adfm.202100919 提前访问日期: APR 2021 出版年: JUN 2021

Web of Science 核心合集中的 "被引频次": 165

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摘要: Semiconductor photocatalysis acts as a sustainable green technology to convert solar energy for environmental purification and production of renewable energy. However, the current photocatalysts suffer from inefficient photoabsorption, rapid recombination of photogenerated electrons and holes, and inadequate surface reactive sites. Introduction of oxygen vacancies (OVs) in photocatalysts has been demonstrated to be an efficacious strategy to solve these issues and improve photocatalytic efficiency. This review systematically summarizes the recent progress in the oxygen vacant semiconductor photocatalysts. Firstly, the formation and characterizations of OVs in semiconductor photocatalysts are briefly introduced. Then, highlighted are the roles of OVs in the photocatalytic reactions of three types of typical oxygen-containing semiconductors, including metal oxides (TiO2, ZnO, WO3, W18O49, MoO3, BiO2-x, SnO2, etc), hydroxides (In(OH)(3), Ln(OH)(3) (Ln=La, Pr, and Nd), Layered double hydroxides) and oxysalts (bismuth-based oxysalts and others) photocatalysts. Moreover, the advanced photocatalytic applications of oxygen vacant semiconductor photocatalysts, such as pollutant removal, H-2 production, CO2 reduction, N-2 fixation and organic synthesis are systematically summarized. Finally, an overview on the current challenges and a prospective on the future of oxygen vacant materials is proposed.

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第 207 条，共 300 条

标题: Phanerozoic paleotemperatures: The earth's changing climate during the last 540 million years

作者: Scotese, CR (Scotese, Christopher R.); Song, HJ (Song, Haijun); Mills, BJW (Mills, Benjamin J. W.); van der Meer, DG (van der Meer, Douwe G.)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 215 文献号: 103503 DOI: 10.1016/j.earscirev.2021.103503 出版年: APR 2021

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摘要: This study provides a comprehensive and quantitative estimate of how global temperatures have changed during the last 540 million years. It combines paleotemperature measurements determined from oxygen isotopes with broader insights obtained from the changing distribution of lithologic indicators of climate, such as coals, evaporites, calcretes, reefs, and bauxite deposits. The waxing and waning of the Earth's great polar icecaps have been mapped using the past distribution of tillites, dropstones, and glendonites. The global temperature model presented here includes estimates of global average temperate (GAT), changing tropical temperatures (Delta T degrees tropical), deep ocean temperatures, and polar temperatures. Though similar, in many respects, to the temperature history deduced directly from the study of oxygen isotopes, our model does not predict the extreme high temperatures for the Early Paleozoic required by isotopic investigations. The history of global changes in temperature during the Phanerozoic has been summarized in a "paleotemperature timescale" that subdivides the many past climatic events into 8 major climate modes; each climate mode is made up of 3-4 pairs of warming and cooling episodes (chmnotemps). A detailed narrative describes how these past temperature events have been affected by geological processes such as the eruption of Large Igneous Provinces (LIPS) (warming) and bolide impacts (cooling). The paleotemperature model presented here allows for a deeper understanding of the interconnected geologic, tectonic, paleoclimatic, paleoceanographic, and evolutionary events that have shaped our planet, and we make explicit predictions about the Earth's past temperature that can be tested and evaluated. By quantitatively describing the pattern of paleotemperature change through time, we may be able to gain important insights into the history of the Earth System and the fundamental causes of climate change on geological timescales. These insights can help us better understand the problems and challenges that we face as a result of Future Global Warming.

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第 208 条，共 300 条

标题: Forced waves and gap formations for a Lotka-Volterra competition model with nonlocal dispersal and shifting habitats

作者: Wang, JB (Wang, Jia-Bing); Wu, CF (Wu, Chufen)

来源出版物: NONLINEAR ANALYSIS-REAL WORLD APPLICATIONS 卷: 58 文献号: 103208 DOI: 10.1016/j.nonrwa.2020.103208 出版年: APR 2021

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摘要: This paper is mainly concerned with the forced waves and gap formations for a Lotka-Volterra competition model with nonlocal dispersal and shifting habitats. We first show that there exist two positive numbers c(1)\* and c(2)\* such that the system admits a forced wave provided that the forcing speed c is an element of (-c(2)\*, c(1)\*) by the iterative techniques combining with some known results for the forced moving KPP equations. Meanwhile, we use some delicate analysis to obtain the asymptotic behaviors at infinity of the forced waves with nonzero forcing speed c is an element of (-c(2)\*, 0) boolean OR (0, c(1)\*). Then, based on the comparison argument, we prove that the gap formations exist for c > c(1)\* and c < -c(2)\*. Finally, some numeric simulation results are presented to confirm our theoretical results, which also contains the critical cases of c = c(1)\* and c = -c(2)\*. (C) 2020 Elsevier Ltd. All rights reserved.

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第 209 条，共 300 条

标题: Differential crustal rotation and its control on giant ore clusters along the eastern margin of Tibet

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来源出版物: GEOLOGY 卷: 49 期: 4 页: 428-432 DOI: 10.1130/G47855.1 出版年: APR 1 2021

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被引频次合计: 58

摘要: Controls on the formation and distribution of mineralization in continental collisional settings remain unclear. However, our synthesis of diverse geophysical data sets from the eastern margin of Tibet revealed that differential crustal rotation played a key role in the production of a variety of mineralization types. Due to Cenozoic continental collision between India and Eurasia, the elongated continental blocks in the eastern margin of Tibet were extruded and reoriented. Prior to block extrusion in the Eocene, two giant porphyry-skarn ore clusters formed at the boundaries between the central segment and both the northern and southern segments of the Jinshajiang-Ailaoshan suture zone. These crustal segment boundaries displayed counterclockwise rotation, due to clockwise rotation of the central segment relative to both the essentially immobile northern and southern segments, combined with crust-mantle decoupling. This is considered to have induced crustal friction and resultant generation of fertile magmas that formed the porphyry-skarn Cu-Au deposits. During Oligocene-Miocene block extrusion, differential rotation of upper crust occurred on the western and eastern sides of the north-northwest-trending Central Axis fault in the Lanping-Simao basin. Two Oligocene-Miocene Mississippi Valley?type ore clusters occur on fault segments with anomalous differential rotation of 70 degrees to 80 degrees, suggesting that this differential rotation resulted in local extension with consequent ore-fluid influx.

入藏号: WOS:000640792800015

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第 210 条，共 300 条

标题: Fluid compositions reveal fluid nature, metal deposition mechanisms, and mineralization potential: An example at the Haobugao Zn-Pb skarn, China

作者: Shu, QH (Shu, Qihai); Chang, ZS (Chang, Zhaoshan); Mavrogenes, J (Mavrogenes, John)

来源出版物: GEOLOGY 卷: 49 期: 4 页: 473-477 DOI: 10.1130/G48348.1 出版年: APR 1 2021

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被引频次合计: 57

摘要: Fluid inclusion compositions obtained from laser ablation?inductively coupled plasma? mass spectrometry at the Haobugao Zn-Pb skarn in northeastern China provide constraints on fluid origin, evolution, and metal deposition mechanisms and an example of evaluating mineralization potential. Metal concentrations in the prograde fluids were high (up to 1.4 wt% Zn and 1.8 wt% Pb) but remained in solution, likely due to the high temperatures (440?575 ?C) and salinities (35.4?45.3 wt% NaCl equivalent). Absolute concentrations of elements (e.g., Rb and Na) and mass ratios (e.g., Zn/Na and K/Na) reveal that the early, prograde fluids were magmatic, consistent with the oxygen isotope composition of fluids (?18OH2O = 5.5%0?8.5%0). Later mixing with a meteoric fluid caused dilution and Zn-Pb deposition, as revealed by lowered element concentrations and Pb/(Na + K) and Zn/(Na + K) ratios in the sulfide-stage fluid inclusions. Elevated Ca/K ratios in sphalerite-hosted inclusions indicate fluid-carbonate reactions that buffered fluid pH, also facilitating Zn-Pb precipitation. Although cassiterite and molybdenite occur locally at Haobugao, mass balance calculation shows low metal endowment (maximum 2900 t Sn and 2200 t Mo) of the system. Furthermore, the generally unchanged Sn/(Na + K) and Mo/(Na + K) ratios from pre- to late-mineralization fluids suggest that the fluids were never saturated in Sn and Mo. Therefore, finding much Sn or Mo at Haobugao is unlikely. This demonstrates a potential tool for evaluating the metal endowment of a mineral prospect, which may guide exploration.

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第 211 条，共 300 条

标题: Prevalence of depressive symptoms among Chinese university students amid the COVID-19 pandemic: a systematic review and meta-analysis

作者: Luo, W (Luo, Wei); Zhong, BL (Zhong, Bao-Liang); Chiu, HFK (Chiu, Helen Fung-Kum)

来源出版物: EPIDEMIOLOGY AND PSYCHIATRIC SCIENCES 卷: 30 文献号: e31 DOI: 10.1017/S2045796021000202 出版年: MAR 26 2021

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摘要: Aims

Chinese university students are at high risk for depressive symptoms and the ongoing coronavirus disease 2019 (COVID-19) pandemic may have exacerbated the mental health of university students. However, existing studies on depressive symptoms in Chinese university students during the COVID-19 pandemic reported a wide range of prevalence estimates, making mental health planning for this population difficult. The objective of this study was to conduct a systematic review and meta-analysis of surveys that assessed the prevalence of depressive symptoms in Chinese university students amid the COVID-19 pandemic.

Methods

Major Chinese (CNKI, Wanfang, VIP) and English (PubMed, Embase, PsycInfo) databases and preprint platforms were searched to identify cross-sectional studies containing data on the prevalence of depressive symptoms in Chinese university students during the pandemic. Two authors independently retrieved the literature, evaluated the eligibility of potential studies, assessed the risk of bias (RoB) of included studies, and extracted data. RoB was assessed with the Joanna Briggs Institute Critical Appraisal Checklist for Studies Reporting Prevalence Data.

Results

In total, 1177 records were retrieved, and 84 studies involving 1 292 811 Chinese university students during the pandemic were included. None of the included studies were rated as completely low RoB. Statistically significant heterogeneity in the prevalence estimates of included studies was detected (I-2 = 99.9%, p < 0.001). The pooled prevalence of depressive symptoms was 26.0% (95%CI: 23.3-28.9%), which was significantly higher in female than in male students (30.8% v. 28.6%, p < 0.001), in postgraduates than in undergraduates (29.3% v. 22.9%, p < 0.001), in students living inside than in those living outside the COVID-19 epicentre (27.5% v. 22.3%, P < 0.001), in students from universities at the epicentre than in those from universities outside the epicentre (26.2% v. 23.1%, p < 0.001), in students who had close contact with COVID-19 than in those who did not (46.0% v. 25.0%, p < 0.001), and in students who had acquaintances or relatives infected with COVID-19 (39.7% v. 24.0%, p < 0.001) than in those who did not. Five sources of heterogeneity were identified from the subgroup analysis: survey period, % of males among the survey sample, scale of depressive symptoms, cutoff score of the scale and level of RoB.

Conclusions

Over one-fourth of Chinese university students experienced depressive symptoms during the COVID-19 pandemic. Mental health services for this population should include periodic evaluation of depressive symptoms, expanded social support and psychiatric assessment and treatment when necessary. It is also necessary to design depression prevention programmes that target higher-risk cohorts of university students.

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第 212 条，共 300 条

标题: Asymmetric impact of fossil fuel and renewable energy consumption on economic growth: A nonlinear technique

作者: Baz, K (Baz, Khan); Cheng, JH (Cheng, Jinhua); Xu, DY (Xu, Deyi); Abbas, K (Abbas, Khizar); Ali, I (Ali, Imad); Ali, H (Ali, Hashmat); Fang, CD (Fang, Chuandi)

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摘要: Harnessing energy resources contributes to achieving economic targets and environmental change, as well as fulfilling energy demands via producing clean energy and new technologies. However, the procedures for accomplishing these interlinked objectives and achieving sustainable development need to be addressed empirically. To this end, we examined the nexus between fossil fuel, renewable energy, and economic growth, using a time series data 1980e2017 of Pakistan. By employing a non-linear autoregressive distributed lag and asymmetric causality approaches, this study determines the asymmetric impact of one variable on the others. During the investigation, the results confirmed asymmetric and nonlinear co-integration between pairs of the variables. An asymmetric feedback causality was observed between positive shocks to economic growth and renewable energy consumption. In contrast, the asymmetric causality test showed that positive and negative shocks in fossil fuel and economic growth had a neutral effect, while a symmetric bidirectional hypothesis was observed between fossil fuel consumption and economic growth. Finally, an asymmetrically unidirectional causal nexus was confirmed between foreign direct investment and economic growth. Prospectively, our findings suggest the significance of clean energy along with the installation of new technologies for achieving sustainable economic growth without undermining environmental intactness and ecosystem.

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第 213 条，共 300 条

标题: The effects of biochar addition on soil physicochemical properties: A review

作者: Zhang, YF (Zhang, Yafu); Wang, JM (Wang, Jinman); Feng, Y (Feng, Yu)

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摘要: Excessive land use has a series consequences on the degradation of land function and exerts tremendous pressure on the ecological environment. Farming, mining, and heavy metal pollution have resulted in many negative effects on soils. Biochar has become a hot research topic in the fields of agriculture, environment, and energy as an environmentally friendly soil improver in recent years. The application of biochar for both agricultural and environmental benefits has been studied and reviewed extensively. However, there are limited reviews on the structures of biochar and other biochar applications. This paper provides an overview of recent advances in the effects of the various physicochemical properties of biochar and biochar utilizations including its use as catalyst, soil amendment, water retention, contaminant adsorbent, gas storage, ion exchange, and soil microbial activity. Discussions on biochar on the physical, chemical, biological properties after amendment to the soil and preparation condition. However, the negative effects of biochar in preparations and applications need to be recognized through scientific observation and research. It is anticipated that further research on biochar amendment will increase the understanding on the interactions of biochar with soils, review the negative effects of biochar and it should be alleviated as much as possible.

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第 214 条，共 300 条

标题: A Core Logging, Machine Learning and Geostatistical Modeling Interactive Approach for Subsurface Imaging of Lenticular Geobodies in a Clastic Depositional System, SE Pakistan

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摘要: Facies models are essential tools for imaging subsurface geobodies and for reducing exploration and development risks efficiently. The Lower Goru Formation is one of the principal formations in the Lower Indus Basin, Pakistan. Its substantial hydrocarbon potential is unexplored, as most of the wells within the Sawan gas field are facing relatively low production yields. This study aimed to delineate subsurface geobodies by developing a facies model to study the depositional processes and facies distributions that have been neglected previously. The interactive approaches used in this research consisted of petrophysical, mineral composition, well-log facies, and horizon attribute analyses, as well as an unsupervised vector quantizer artificial neural network (UVQ-ANN) and sequential indicator simulation (SIS) modeling. A series of E-W-oriented lenticular geobodies were delineated. These geobodies had variable thicknesses, and they pinch out to the NW and prograde to the NE. The results of the SIS, UVQ-ANN, petrographic analysis, and attribute analysis show a fluvial fan-delta sedimentary system. The reservoir sands were deposited in distributary mouth bars and deltaic channels in proximal delta front settings. The coarse- to very fine-grained reservoir sands prograde toward the NE. Thinly laminated beds of fine-grained black shales and lime muddy siltstones were deposited under low-energy conditions in mid-shelf marine settings. The adopted methodology for the generated facies model can be extended to different basins within Pakistan with the same geological settings, and it can be used for prospect evaluation, future drilling, and development plans within the Sawan gas field in the Lower Indus Basin.

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第 215 条，共 300 条

标题: China's Chang'e-5 landing site: Geology, stratigraphy, and provenance of materials

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摘要: China's Chang'e-5 (CE-5) mission, the first lunar sample return mission since 1976, landed at 43.06 degrees N, 51.92 degrees W on Dec. 1, 2020, in Northern Oceanus Procellarum. CE-5 targeted a mare plain (Em4/P58) composed of distinctive young (similar to 1.6-1.7 Ga) moderate-Ti mare basalts, with elevated Th abundance (inherent or extraneous). Thus, the regolith and rock fragments sampled by CE-5 come from some of the youngest mare basalts on the Moon, near Rima Sharp, and from the center of the globally anomalous Procellarum KREEP Terrane (PKT), hypothesized to be responsible for the generation of the young volcanism. To provide context for the analysis and interpretation of the returned samples and in-situ measurements of the regolith substructure with penetrating radar, we constructed a detailed geologic map and stratigraphic assessment of the site. The stratigraphy consists of ancient highland materials (PKT crust and ejecta from Iridum and Imbrium basins), local silica-rich volcanism, overlain by a sequence of mare basalts, capped with Em4/P58. A similar to 4-7 m thick regolith layer developed by post-mare bombardment overlies the Em4/P58 protolith and contains admixed impact ejecta from distant sources, mainly from Harpalus (similar to 6 wt.%), followed by Copernicus (similar to 2 wt.%) and Aristarchus (similar to 1 wt.%). New crater size-frequency measurements of Em4/P58 provide the necessary crater spatial density reference for calibration of the lunar cratering chronology with radiometric ages of the returned samples. The geological map and assessment of regolith provenance indicate that samples returned by CE-5 will address fundamental questions in lunar chronology, thermal evolution, basalt petrogenesis, and the nature of PKT, as well as provide key calibration for lunar and planetary chronologies and remote sensing data. (C) 2021 Elsevier B.V. All rights reserved.

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第 216 条，共 300 条

标题: Moderating the effect of globalization on financial development, energy consumption, human capital, and carbon emissions: evidence from G20 countries

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摘要: The policy debate on the financial development and dynamic of carbon dioxide (CO2) emission is topical. Globalization can affect this relationship by making financial investments in green energy and environment-friendly technology, as environmental sustainability is the primary concern for modern society. This study proposes a newly formulated conceptual framework to explore globalization's moderating role on exoplanetary variables (financial development, energy consumption, human capital, and gross domestic product) and CO2 emission. We employed Fixed Effect Ordinary Least Squares (FE-OLS), Driscoll-Kraay standard error approach (D-K), and Dumitrescu and Hurlin's (2012) panel causality test. Our sample of the study comprised full and subsamples of G20 countries (excluding the European Union) from 1986 to 2018. The results indicated that financial development and human capital decreased carbon emissions, while GDP and energy consumption substantially increased carbon emissions during the study time. Further, globalization moderated the positive impact of financial development and human development on carbon emissions. A sustainable environmental agenda is achieved by a stronger financial system, encouraging green finance, and including technical education that improves production efficiency. However, globalization moderated the negative impact of energy consumption and GDP on carbon emission. Besides, we also reported the bidirectional causal relationship of GDP to energy consumption. Our empirical research provides new insights for policymakers and governments to formulate country-based policies to protect environmental quality while achieving sustainable economic goals.

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标题: Interpreting and reporting 40Ar/39Ar geochronologic data

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摘要: The 40Ar/39Ar dating method is among the most versatile of geochronometers, having the potential to date a broad variety of K-bearing materials spanning from the time of Earth's formation into the historical realm. Measurements using modern noble-gas mass spectrometers are now producing 40Ar/39Ar dates with analytical uncertainties of similar to 0.1%, thereby providing precise time constraints for a wide range of geologic and extraterrestrial processes. Analyses of increasingly smaller subsamples have revealed age dispersion in many materials, including some minerals used as neutron fluence monitors. Accordingly, interpretive strategies are evolving to address observed dispersion in dates from a single sample. Moreover, inferring a geologically meaningful "age" from a measured "date" or set of dates is dependent on the geological problem being addressed and the salient assumptions associated with each set of data. We highlight requirements for collateral information that will better constrain the interpretation of 40Ar/39Ar data sets, including those associated with single-crystal fusion analyses, incremental heating experiments, and in situ analyses of microsampled domains. To ensure the utility and viability of published results, we emphasize previous recommendations for reporting 40Ar/39Ar data and the related essential metadata, with the amendment that data conform to evolving standards of being findable, accessible, interoperable, and reusable (FAIR) by both humans and computers. Our examples provide guidance for the presentation and interpretation of 40Ar/39Ar dates to maximize their interdisciplinary usage, reproducibility, and longevity.

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标题: Spontaneous imbibition in tight porous media with different wettability: Pore-scale simulation

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摘要: Spontaneous imbibition is significantly influenced by rock wettability, and it has been extensively studied in core-based experiments and numerical simulations owing to its important role in the development of oil/gas reservoir. Due to the fine pore structure and complex wettability of tight sandstone, an in-depth exploration of the effects of wettability on the pore-scale flow physics during spontaneous imbibition is of great value to complement traditional experimental studies and enhance the understanding of microscopic flow mechanisms during the development of tight oil reservoirs. Based on a X-ray computed tomography scanning experiment and a lattice Boltzmann multiphase model, in this work, we systematically investigate the effects of different hydrophilic strengths on the evolution of the imbibition fronts within the micropores and the degree of nonwetting fluid recovery during spontaneous imbibition of tight sandstone. The results show that the wettability significantly affects the morphological characteristics of the imbibition fronts. Under strong hydrophilic conditions, the wetting fluid preferentially invades the pore corner in the form of angular flow. As the contact angle increases, the hysteresis effect at the main terminal interface decreases, and the two-phase interface becomes regular and compact. Wettability also significantly affects the imbibition rate and the nonwetting fluid recovery degree. The smaller the contact angle, the faster the imbibition rate and the higher the recovery degree of nonwetting fluids during the cocurrent spontaneous imbibition. Published under license by AIP Publishing.

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第 219 条，共 300 条

标题: In-situ and triple-collocation based evaluations of eight global root zone soil moisture products

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摘要: Root zone soil moisture (RZSM) is a vital variable for vegetation growth, drought monitoring and agricultural water management. Satellite remote sensing measures soil moisture at the surface layer, while RZSM is derived usually by model-based simulations. Here, we provide the first comprehensive evaluation of eight RZSM products at a global scale, including GLDAS NOAH, ERA-5, MERRA-2, NCEP R1, NCEP R2, JRA-55, SMAP level 4 and SMOS level 4 datasets. An in-situ validation based on the stations from the International Soil Moisture Network (ISMN) and a triple collocation (TC) evaluation are both conducted to assess the accuracy of these RZSM products. SMAP exhibits the median highest correlation and the median lowest RMSE with in-situ stations over North America. In the TC analysis, MERRA-2 shows the highest median correlation and the median lowest error standard deviation with the unknown truth, followed by GLDAS, SMAP, JRA-55 and ERA-5. A temporal pattern analysis indicates that SMOS has a dry bias relative to other datasets and NCEP R1 has larger seasonal variations relative to other datasets over Asia and North America. The TC analysis indicates that MERRA-2, SMAP, GLDAS, JRA-55, and ERA-5 have better performance relative to other datasets. SMAP is not as good as GLDAS, MERRA-2 and JRA-55 in RZSM estimation over forest areas. The possible factors influencing RZSM performance are discussed, including precipitation forcing, assimilated observations, radio frequency interference issue and validation methods. These results and conclusions may provide new insights for the improvement of model-based RZSM estimation.

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第 220 条，共 300 条

标题: Construction of landscape ecological network based on landscape ecological risk assessment in a large-scale opencast coal mine area

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摘要: The comprehensive effect of multi-source factors changes the landscape structure and reduces the quality of landscape ecology in large-scale opencast coal mine area, resulting in an ecologically fragile environment. Landscape ecological quality directly affects the flow and transmission of ecological functions, which is an important factor in the construction of landscape ecological network. In the study, based on the Landsat remote sensing images of 1986, 1996, 2000, 2009, and 2015 in the Pingshuo opencast coal mine area of the Loess plateau in Shanxi Province of China, the landscape loss index and ecological sensitivity index were selected to establish the landscape ecological risk assessment model, and the spatial and temporal characteristics of the landscape ecological risks from 1986 to 2015 were analyzed. Considering the impact of landscape ecological quality on ecological resistance, the Minimum Cumulative Resistance model (MCR) was applied to build a landscape ecological network based on the landscape ecological risk assessment in 2015 to identify the important ecological elements, and the complex network method was used to analyze the structure of landscape ecological network. The local risk level of the study area reduced with opencast coal mining; however, the overall risk level was improved with conducting land reclamation. The high-risk area showed a trend of spreading from southwest to northeast; the risk of the peripheral areas of urban construction land and mining land was relatively high, while that of the forest and grassland area was relatively low. The risk change of the study area was mainly affected by the mining scale, urban expansion, conversion of farm land to forest and grassland, land reclamation, and village relocation. Through the complex network method, the energy flow fluency and the relationship between nodes were enhanced after the optimization of the landscape ecological network, and the ecological elements for specific land use protection were identified. The research results can provide scientific basis for the optimization of landscape pattern and the construction of ecological security pattern in Pingshuo opencast coal mine area. (C) 2020 Elsevier Ltd. All rights reserved.

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标题: Highly flame-retardant epoxy-based thermal conductive composites with functionalized boron nitride nanosheets exfoliated by one-step ball milling

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摘要: Boron nitride nanosheet (BNNS) reveals a huge potential in preparing highly flame-retardant polymer-based thermal conductive composite, but is limited by its difficult exfoliation and functionalization. Here, hexagonal boron nitride (hBN) was simultaneously exfoliated and flame-retardant functionalized into BNNS via one-step ball milling process based on the synergetic effect of mechanical shear and chemical peeling of ammonium phosphate and sodium hydroxide. Then the epoxy (EP)-based composites containing hBN or BNNS were prepared by solution blending and program-controlled curing. The possible mechanochemical reaction mechanisms were proposed according to the incorporation of density functional theory (DFT) calculations and chemical structure characteristics. As one of potential applications, the obtained flame-retardant functionalized BNNS (BNNS1 and BNNS2) were used as multifunctional additives for fabricating high-performance EP-based thermal conductive composites with excellent flame retardancy. As expected, the obtained EP-based composites containing only 5 wt % BNNS exhibited a superior flame retardancy with a dramatic decrease in the values of peak heat release rate (PHRR), the total heat release (THR), the smoke production rate (SPR) and the total smoke production (TSP) corresponding to 60.9%, 35.7%, 44.3% and 38.8% reductions, respectively, compared to neat EP. The dramatical enhancement in flame retardancy was mainly attributed to the catalytic charring effect and physical barrier action of flame-retardant functionalized BNNS, led to the formation of a compact and robust char layer during combustion to protect the underlying polymer. Simultaneously, due to uniform dispersion and strong interfacial adhesion, the incorporation of BNNS not only increased the thermal conduction paths by increasing specific surface area, but also reduced the interfacial thermal resistance (R-b) caused by phonon scattering, leading to an enhancement (312.4% and 397.0%) in the TC of EP/BNNS composites at 30 wt% BNNSi and BNNS2, respectively.

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ESI 热点论文: N

输出日期: 2023-09-04

第 222 条，共 300 条

标题: How to drive green innovation in China's mining enterprises? Under the perspective of environmental legitimacy and green absorptive capacity

作者: Zhou, M (Zhou, Min); Govindan, K (Govindan, Kannan); Xie, XBA (Xie, Xiongbiao); Yan, L (Yan, Liang)

来源出版物: RESOURCES POLICY 卷: 72 文献号: 102038 DOI: 10.1016/j.resourpol.2021.102038 提前访问日期: FEB 2021 出版年: AUG 2021

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被引频次合计: 52

摘要: Environmental legitimacy and green absorptive capacity immensely contribute to ensuring green innovation; however, their integration in driving green innovation in mining enterprises (MEs) remains unexplored. This study surveys 133 MEs in China's mining sector and uses multi-regression analysis to investigate the relationships between environmental legitimacy, organisational factors of senior management cognition and green strategic orientation, green absorptive capacity, and green innovation in MEs. We find that: (1) Environmental legitimacy, which includes formal and informal institutional pressure, positively impacts senior management cognition and green strategic orientation in mining enterprises. (2) Senior management cognition and green strategic orientation have a positive association with MEs' green innovation. They also have a positive mediating effect on the relationship between environmental legitimacy and green innovation. (3) Green absorptive capacity can positively moderate the relationship between senior management cognition and green innovation, and between green strategic orientation and green innovation. (4) The size of the enterprise, as a control variable, has a significant correlation with green innovation. Finally, our study proposes four leading policy suggestions for MEs and policymakers, including building a comprehensive green innovation evaluation framework involving multiple participants, reinforcing the executive's green commitments and proactive green strategic orientation, and establishing a company-wide green knowledge learning system and external green knowledge cooperation.

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ESI 热点论文: N

输出日期: 2023-09-04

第 223 条，共 300 条

标题: Urban function classification at road segment level using taxi trajectory data: A graph convolutional neural network approach

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来源出版物: COMPUTERS ENVIRONMENT AND URBAN SYSTEMS 卷: 87 文献号: 101619 DOI: 10.1016/j.compenvurbsys.2021.101619 提前访问日期: FEB 2021 出版年: MAY 2021

Web of Science 核心合集中的 "被引频次": 43

被引频次合计: 45

摘要: Extracting hidden information from human mobility patterns is one of the long-standing challenges of urban studies. In addition, exploring the relationship between urban functional structure and traffic spatial interaction pattern has long been of interest. Recently, vehicle GPS trajectory data emerged as a popular data source for revealing human mobility patterns and urban functions. However, few studies have fully leveraged traffic interaction information that is hidden in human mobility patterns to identify urban functions at the road segment level. To address this issue, a geo-semantic analysis framework was introduced in this study to model the relationship between traffic interaction and urban functions at the road segment level. First, a Road-Trajectory corpus was built and trained to obtain the semantic embedding representation of road segments. Then, considering topological connections between road segments, we used a graph convolutional neural network model to process the contextual and topological information to classify social functions along streets. A case study in Beijing, China, using a large volume of real-world taxi trajectories data, was conducted. The results show that our proposed methods, with relative less loss and high accuracy, outperform other comparative methods for classifying urban functions at the road segment level. This work contributes to the assessment of urban functional structure, and further aiding urban planners in designing better urbanization strategies with regard to traffic interaction and urban space structure.

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第 224 条，共 300 条

标题: Geohazards and human settlements: Lessons learned from multiple relocation events in Badong, China - Engineering geologist's perspective

作者: Gong, WP (Gong, Wenping); Juang, CH (Juang, C. Hsein); Wasowski, J (Wasowski, Janusz)

来源出版物: ENGINEERING GEOLOGY 卷: 285 文献号: 106051 DOI: 10.1016/j.enggeo.2021.106051 提前访问日期: FEB 2021 出版年: MAY 2021

Web of Science 核心合集中的 "被引频次": 72

被引频次合计: 74

摘要: Mountainous regions are inherently susceptible to geohazards, such as landslides and debris flows, with the threat of natural disasters compounded by human activities (mainly settlements). Lessons learned from past events that involved the interactions between human activities and geohazards are helpful for future site selections of human settlements in mountainous regions. To this end, the events associated with county seat relocations in Badong, a typical county in the Three Gorges Reservoir region, China, are studied from an engineering geologist's perspective. Over its history, the county seat was relocated multiple times, with the first relocation traced back to the Song dynasty (960-1279 CE) and the last two relocations linked to the Three Gorges Dam project. By studying geohazards and their interactions with human activities in these county-seat relocations, and through the reconstruction of these events, we secure insights into decision-making for these events. As part of the reconstruction of these relocation events, we analyze a giant pre-historic landslide, whose discovery ultimately prompted the third relocation. Using the case history of this landslide, we also discuss and emphasize the importance of proactive monitoring of geohazards for disaster resilience enhancement, recognizing that our knowledge of nature is vastly incomplete.

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第 225 条，共 300 条

标题: Z-scheme g-C3N4-AQ-MoO3 photocatalyst with unique electron transfer channel and large reduction area for enhanced sunlight photocatalytic hydrogen production

作者: Ma, X (Ma, Xue); Wang, GW (Wang, Guowei); Qin, LF (Qin, Lifan); Liu, J (Liu, Jue); Li, B (Li, Bing); Hu, YA (Hu, Yuanan); Cheng, HF (Cheng, Hefa)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 288 文献号: 120025 DOI: 10.1016/j.apcatb.2021.120025 提前访问日期: FEB 2021 出版年: JUL 5 2021

Web of Science 核心合集中的 "被引频次": 68

被引频次合计: 68

摘要: The transfer rate of photo-generated electrons is a critical factor that determines the photocatalytic efficiency of Z-scheme photocatalytic systems. Here, a novel Z-scheme g-C3N4-AQ-MoO3 photocatalyst with anthraquinone (AQ) serving as an e- transfer channel for hydrogen production was proposed. Its enhanced photocatalytic activity is due to the accelerated transfer of e(-) in the form of charge inside AQ, which also suppresses the recombination of photo-generated e(-) and h(+). In addition, the reduction area is significantly increased by the exfoliation of g-C3N4 into thin layers. Due to the synergistic effect of rapid e(-) transfer and large reduction area, Z-scheme g-C3N4-AQ-MoO3 has a high hydrogen production efficiency that can reach 2018 mu mol/g with the presence of triethanolamine as a hole sacrificial agent after 180 min of simulated sunlight illumination. This work provides a new strategy to design and develop Z-scheme photocatalytic systems with excellent electron migration rates and high charge separation efficiency.

入藏号: WOS:000632996200002

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ESI 热点论文: N

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第 226 条，共 300 条

标题: Potassium-ion batteries: outlook on present and future technologies

作者: Min, X (Min, Xin); Xiao, J (Xiao, Jun); Fang, MH (Fang, Minghao); Wang, W (Wang, Wei (Alex)); Zhao, YJ (Zhao, Yajing); Liu, YG (Liu, Yangai); Abdelkader, AM (Abdelkader, Amr M.); Xi, K (Xi, Kai); Kumar, RV (Kumar, R. Vasant); Huang, ZH (Huang, Zhaohui)

来源出版物: ENERGY & ENVIRONMENTAL SCIENCE 卷: 14 期: 4 页: 2186-2243 DOI: 10.1039/d0ee02917c 提前访问日期: FEB 2021 出版年: APR 1 2021

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被引频次合计: 290

摘要: The limited resources and uneven distribution of lithium stimulate strong motivation to develop new rechargeable batteries that use alternative charge carriers. Potassium-ion batteries (PIBs) are at the top of the list of alternatives because of the abundant raw materials and relatively high energy density, fast ion transport kinetics in the electrolyte, and low cost. However, several challenges still hinder the development of PIBs, such as low reversible capacity, poor rate performance, and inferior cycling stability. Research on the cathode is currently focused on developing materials with high energy density and cycling stability, mainly including layered transition metal oxides, polyanion compounds, organic compounds, etc. Anodes based on intercalation reactions, conversion reactions, and alloying with potassium are currently under development, and promising results have been published. This review comprehensively summarizes the research effort to date on the electrode material optimization (e.g., crystals, morphology, reaction mechanisms, and interface control), the synthesis methods, and the full cell fabrication for PIBs to enhance the electrochemical potassium storage and provide a platform for further development in this battery system.

入藏号: WOS:000638274600001

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输出日期: 2023-09-04

第 227 条，共 300 条

标题: Strain-induced semiconductor to metal transition in MA(2)Z(4) bilayers (M = Ti, Cr, Mo; A = Si; Z = N, P)

作者: Zhong, HX (Zhong, Hongxia); Xiong, WQ (Xiong, Wenqi); Lv, PF (Lv, Pengfei); Yu, J (Yu, Jin); Yuan, SJ (Yuan, Shengjun)

来源出版物: PHYSICAL REVIEW B 卷: 103 期: 8 文献号: 085124 DOI: 10.1103/PhysRevB.103.085124 出版年: FEB 17 2021

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被引频次合计: 63

摘要: Very recently, a new type of two-dimensional layered material, MoSi2N4, was fabricated that is semiconducting with weak interlayer interaction, high strength, and excellent stability. We systematically investigate the effect of vertical strain on the electronic structure of MA(2)Z(4) (M = Ti/Cr/Mo, A = Si, Z = N/P) bilayers. Taking bilayer MoSi2N4 as an example, our first-principles calculations show that its indirect band gap decreases monotonically as the vertical compressive strain increases. Under a critical strain around 22%, it undergoes a transition from semiconductor to metal. We attribute this to the opposite energy shift of states in different layers, which originates from the built-in electric field induced by the asymmetric charge transfer between two inner sublayers near the interface. Similar semiconductor to metal transitions are observed in other strained MA(2)Z(4) bilayers, and the estimated critical pressures to realize such transitions are within the same order as semiconducting transition metal dichalcogenides. The semiconductor to metal transitions in the family of MA(2)Z(4) bilayers present interesting possibilities for strain-induced engineering of their electronic properties.

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第 228 条，共 300 条

标题: Ecological vulnerability assessment based on AHP-PSR method and analysis of its single parameter sensitivity and spatial autocorrelation for ecological protection ? A case of Weifang City, China

作者: Hu, XJ (Hu, Xiaojing); Ma, CM (Ma, Chuanming); Huang, P (Huang, Peng); Guo, X (Guo, Xu)

来源出版物: ECOLOGICAL INDICATORS 卷: 125 文献号: 107464 DOI: 10.1016/j.ecolind.2021.107464 提前访问日期: FEB 2021 出版年: JUN 2021

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摘要: With the continuous development of society, the contradiction between human and nature becomes increasingly prominent, and ecological vulnerability assessment is an effective tool to alleviate the contradiction. In this study, AHP-PSR (Analytic Hierarchy Process - Press-State-Response) model was used to assess the ecological vulnerability of Weifang City. PSR model was used to select parameters, AHP was used to determine the weights of parameters, and GIS was used to assess ecological vulnerability. Based on the results of ecological vulnerability assessment, the inherent ecological vulnerability assessment, single parameter sensitivity analysis and spatial autocorrelation analysis were carried out in order to provide specific suggestions for ecological development and protection in this area and provide new ideas for ecological vulnerability research. The results showed that the ecological vulnerability is from low to high, with an area of 44.1%, 44.3%, 9.7%, 0.8% and 1.1% respectively. The areas of inherent ecological vulnerability ranged from low to high are 27.2%, 38.2%, 18.0%, 6.8% and 9.8% respectively. The difference between the assessment results of ecological vulnerability and that of intrinsic ecological vulnerability, indicates the role of human society in changing the inherent natural ecological vulnerability. Human beings can improve the original highly vulnerable ecological environment through their positive activities. The single parameter sensitivity analysis supports this view. Higher and high ecological vulnerability areas should prohibit all acts that damage the ecological environment and improve the vulnerable ecological environment through positive human activities. The areas with high spatial autocorrelation mainly include the north and southeast of Shouguang County, the northeast and south of Anqiu County, Fangzi District, Hanting District, Weicheng District, Kuiwen District, Linqu County, Qingzhou County, Zhucheng County, and Gaomi County. In the case of ecological governance, priority can be given to these areas. This study can provide scientific basis for ecological construction and protection of Weifang City. Single parameter sensitivity analysis and spatial autocorrelation analysis can guide the management of ecological vulnerable areas.

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ESI 热点论文: N

输出日期: 2023-09-04

第 229 条，共 300 条

标题: Fast physically-based model for rainfall-induced landslide susceptibility assessment at regional scale

作者: Medina, V (Medina, Vicente); Hurlimann, M (Hurlimann, Marcel); Guo, ZZ (Guo, Zizheng); Lloret, A (Lloret, Antonio); Vaunat, J (Vaunat, Jean)

来源出版物: CATENA 卷: 201 文献号: 105213 DOI: 10.1016/j.catena.2021.105213 提前访问日期: FEB 2021 出版年: JUN 2021

Web of Science 核心合集中的 "被引频次": 59

被引频次合计: 60

摘要: Rainfall-induced landslides represent an important threat in mountainous areas. Therefore, a physically-based model called "Fast Shallow Landslide Assessment Model" (FSLAM) was developed to calculate large areas (>100 km(2)) with a high-resolution topography in a very short computational time. FSLAM applies a simplified hydrological model and the infinite slope theory, while the two most sensitive soil properties regarding slope stability (cohesion and friction angle) can be stochastically included. The model has five necessary input raster files including information of soil properties, vegetation, elevation and rainfall. The principal output is the probability of failure (PoF) map. The Principality of Andorra was selected as case study, where FSLAM was successfully applied and validated using the existing landslide inventory. The PoF raster file of Andorra (including 19 million cells) was calculated in only 2 min. Therefore, an accurate calibration of the input parameters was easy, which strongly improved the final outcomes.

入藏号: WOS:000631043700027

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ESI 热点论文: N

输出日期: 2023-09-04

第 230 条，共 300 条

标题: Thermally stable and highly efficient red-emitting Eu3+-doped Cs3GdGe3O9 phosphors for WLEDs: non-concentration quenching and negative thermal expansion

作者: Dang, PP (Dang, Peipei); Li, GG (Li, Guogang); Yun, XH (Yun, Xiaohan); Zhang, QQ (Zhang, Qianqian); Liu, DJ (Liu, Dongjie); Lian, HZ (Lian, Hongzhou); Shang, MM (Shang, Mengmeng); Lin, J (Lin, Jun)

来源出版物: LIGHT-SCIENCE & APPLICATIONS 卷: 10 期: 1 文献号: 29 DOI: 10.1038/s41377-021-00469-x 出版年: FEB 1 2021

Web of Science 核心合集中的 "被引频次": 181

被引频次合计: 184

摘要: Red phosphor materials play a key role in improving the lighting and backlit display quality of phosphor-converted white light-emitting diodes (pc-WLEDs). However, the development of a red phosphor with simultaneous high efficiency, excellent thermal stability and high colour purity is still a challenge. In this work, unique non-concentration quenching in solid-solution Cs3Gd1 - xGe3O9:xEu(3+) (CGGO:xEu(3+)) (x = 0.1-1.0) phosphors is successfully developed to achieve a highly efficient red-emitting Cs3EuGe3O9 (CEGO) phosphor. Under the optimal 464 nm blue light excitation, CEGO shows a strong red emission at 611 nm with a high colour purity of 95.07% and a high internal quantum efficiency of 94%. Impressively, this red-emitting CEGO phosphor exhibits a better thermal stability at higher temperatures (175-250 degrees C, >90%) than typical red K2SiF6:Mn4+ and Y2O3:Eu3+ phosphors, and has a remarkable volumetric negative thermal expansion (coefficient of thermal expansion, alpha = -5.06 x 10(-5)/degrees C, 25-250 degrees C). By employing this red CEGO phosphor, a fabricated pc-WLED emits warm white light with colour coordinates (0.364, 0.383), a high colour rendering index (CRI = 89.7), and a low colour coordinate temperature (CCT = 4508 K). These results indicate that this highly efficient red-emitting phosphor has great potential as a red component for pc-WLEDs, opening a new perspective for developing new phosphor materials.

入藏号: WOS:000613720200001

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标题: Incremental Factorization of Big Time Series Data with Blind Factor Approximation

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来源出版物: IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 卷: 33 期: 2 页: 569-584 DOI: 10.1109/TKDE.2019.2931687 出版年: FEB 1 2021

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摘要: Extracting the latent factors of big time series data is an important means to examine the dynamic complex systems under observation. These low-dimensional and "small" representations reveal the key insights to the overall mechanisms, which can otherwise be obscured by the notoriously high dimensionality and scale of big data as well as the enormously complicated interdependencies amongst data elements. However, grand challenges still remain: (1) to incrementally derive the multi-mode factors of the augmenting big data and (2) to achieve this goal under the circumstance of insufficient a priori knowledge. This study develops an incrementally parallel factorization solution (namely I-PARAFAC) for huge augmenting tensors (multi-way arrays) consisting of three phases over a cutting-edge GPU cluster: in the "giant-step" phase, a variational Bayesian inference (VBI) model estimates the distribution of the close neighborhood of each factor in a high confidence level without the need for a priori knowledge of the tensor or problem domain; in the "baby-step" phase, a massively parallel Fast-HALS algorithm (namely G-HALS) has been developed to derive the accurate subfactors of each subtensor on the basis of the initial factors; in the final fusion phase, I-PARAFAC fuses the known factors of the original tensor and those accurate subfactors of the "increment" to achieve the final full factors. Experimental results indicate that: (1) the VBI model enables a blind factor approximation, where the distribution of the close neighborhood of each final factor can be quickly derived (10 iterations for the test case). As a result, the model of a low time complexity significantly accelerates the derivation of the final accurate factors and lowers the risks of errors; (2) I-PARAFAC significantly outperforms even the latest high performance counterpart when handling augmenting tensors, e.g., the increased overhead is only proportional to the increment while the latter has to repeatedly factorize the whole tensor, and the overhead in fusing subfactors is always minimal; (3) I-PARAFAC can factorize a huge tensor (volume up to 500 TB over 50 nodes) as a whole with the capability several magnitudes higher than conventional methods, and the runtime is in the order of $\frac{1}{n}$1n to the number of compute nodes; (4) I-PARAFAC supports correct factorization-based analysis of a real 4-order EEG dataset captured from a variety of epilepsy patients. Overall, it should also be noted that counterpart methods have to derive the whole tensor from the scratch if the tensor is augmented in any dimension; as a contrast, the I-PARAFAC framework only needs to incrementally compute the full factors of the huge augmented tensor.

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标题: A Disturbance Rejection Framework for Finite-Time and Fixed-Time Stabilization of Delayed Memristive Neural Networks

作者: Wang, LM (Wang, Leimin); Zeng, ZG (Zeng, Zhigang); Ge, MF (Ge, Ming-Feng)

来源出版物: IEEE TRANSACTIONS ON SYSTEMS MAN CYBERNETICS-SYSTEMS 卷: 51 期: 2 页: 905-915 DOI: 10.1109/TSMC.2018.2888867 出版年: FEB 2021

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摘要: This paper proposes a unified framework to design sliding-mode control for stabilization of delayed memristive neural networks (DMNNs) with external disturbances. Under the presented framework, finite-time stabilization, and fixed-time stabilization of the controlled DMNNs can be, respectively, obtained by choosing different values for a specific control parameter. It is proved that the system responses can be made reaching the designed sliding-mode surface in finite and fixed time, and then stay on it. Moreover, it also illustrates that the inevitable external disturbances can be rejected by the designed sliding-mode control. Finally, the efficiency and superiority of the obtained main results are verified by comparisons with related works and numerical simulations.

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第 233 条，共 300 条

标题: Enhanced technology based for sewage sludge deep dewatering: A critical review

作者: Cao, BD (Cao, Bingdi); Zhang, T (Zhang, Tao); Zhang, WJ (Zhang, Weijun); Wang, DS (Wang, Dongsheng)

来源出版物: WATER RESEARCH 卷: 189 文献号: 116650 DOI: 10.1016/j.watres.2020.116650 出版年: FEB 1 2021

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摘要: Sludge is an inevitable by product of sewage treatment, and it includes pathogens, heavy metals, organic pollutants and other toxic substances. The components of sludge are complex and variable with extracellular polymeric substances (EPS) being one. EPS are highly hydrophilic and compressible, and make sludge dewatering difficult. Therefore, the development of efficient sludge-dewatering technology is an important means of mitigating rapid sludge growth. At present, the main methods used for sludge deep-dewatering technology are chemical preconditioning with high-pressure filtration and electrical mechanical dewatering. The selection of chemical preconditioning directly determines the final efficiency of the sludge-dewatering process. In this paper, we conduct a comprehensive review of the problems related to sludge dewatering and systematically summarise the impact of different chemical conditioning technologies on the efficiency of sludge dewatering. Furthermore, the characteristics of different enhanced dewatering technologies are evaluated and analysed for their adaptability and final disposal methods. We believe that this review can clarify the chemical conditioner mechanism to improve sludge dewatering, provide reference debugging information for the sludge-dewatering process and promote the development of efficient and environmentally friendly sludge-dewatering technology. (C) 2020 Elsevier Ltd. All rights reserved.

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第 234 条，共 300 条

标题: A newly discovered function of nitrate reductase in chemoautotrophic vanadate transformation by natural mackinawite in aquifer

作者: He, C (He, Chao); Zhang, BG (Zhang, Baogang); Lu, JP (Lu, Jianping); Qiu, R (Qiu, Rui)

来源出版物: WATER RESEARCH 卷: 189 文献号: 116664 DOI: 10.1016/j.watres.2020.116664 出版年: FEB 1 2021

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摘要: Mackinawite (FeS), a widely-distributed natural reducing mineral, can donate electron for various (bio)processes. However, little is known about mackinawite-driven chemoautotrophic bioreduction of toxic vanadate [V(V)] in aquifer. This study demonstrates that V(V) is successfully bioreduced by mackinawite under anaerobic condition via 150-d operation of constructed aquifer. Complete V(V) removal was achieved at the initial concentration of 10 mg/L and flow rate of 0.125 mL/min. Fluctuant hydrochemistry and hydrodynamics affected V(V) removal performance. Biotic activity was identified as the major contribution to V(V) transformation (76.4 +/- 1.01%). Chemoautotrophic genera (e.g., Thiobacillus) could oxidize FeS coupled to direct V(V) reduction independently. Heterotrophic V(V) reducers (e.g., Pseudomonas and Spirochaeta) could also achieve V(V) detoxification by utilizing metabolic intermediates synthesized by autotrophic Fe(II) oxidizers (e.g., Thiobacillus) and S(-II) oxidizing genera (e.g., Sulfuricurvum). Gene abundance and enzymatic activity tests confirmed that nitrate reductase gene napA functioned crucially in chemoautotrophic V(V) reduction by Fe(II) and S(-II) donating electron. V(V) was reduced to insoluble V(IV) while elements in mackinawite were oxidized to Fe(III) and SO42-. This study reveals the coupling of iron, sulfur and vanadium in biogeochemical cycling, and offers a promising strategy for remediation of V(V)-polluted aquifer. (C) 2020 Elsevier Ltd. All rights reserved.

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标题: Impacts of climate-induced permafrost degradation on vegetation: A review

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来源出版物: ADVANCES IN CLIMATE CHANGE RESEARCH 卷: 12 期: 1 特刊: SI 页: 29-47 DOI: 10.1016/j.accre.2020.07.002 出版年: FEB 2021

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摘要: Under a warming climate, degrading permafrost profoundly and extensively affects arctic and alpine ecology. However, most existing relevant studies are more focused on the hydrothermal impacts of vegetation on the underlying permafrost, or symbiosis between vegetation and permafrost, only very few on ecological impacts of permafrost degradation. Additionally, there are much more pertinent investigations in arctic and boreal regions than those in alpine and high-plateau regions at mid- and low latitudes. This study emphasizes on the impact mechanisms of permafrost degradation on vegetation both at high and mid-to low latitudes, addressing vegetation succession trajectories and associated changes in soil hydrology and soil nutrient above degrading permafrost. Permafrost degradation influences vegetation by altering soil hydrology, soil biogeochemical processes and microbial communities, which further improve soil nutrient availability. Furthermore, under a warming climate, vegetation may take two successional trajectories, towards a wetter or drier ecosystem within a certain time period, but to a drier ecosystem in the end upon the thaw of permafrost in case of permeable soils and good drainage. Thus, with rapidly developing remote-sensing and other space- and ground-based and air-borne observational networks and numerical predictive models, the impacting mechanisms of permafrost degradation on vegetation should be timely and better monitored, evaluated and modeled at desired spatiotemporal scales and resolutions by terrestrial or integrated ecosystem models.

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标题: Magmatic perspective on subduction of Paleo-Pacific plate and initiation of big mantle wedge in East Asia

作者: Ma, Q (Ma, Qiang); Xu, YG (Xu, Yi-Gang)

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摘要: Eastern China provides a precious opportunity to explore how subduction drives evolution of the overlying continental lithosphere and to understand the fate of subducted plates. In this study, a synthesis of geochronological, whole-rock geochemical and zircon Hf isotopic data is used to examine temporal and spatial variations in distribution, composition and generation of Mesozoic magmas in the northern North China Craton. A compilation of age data reveals over 1000 km of inland-ward migration of a magmatic belt during 185-145 Ma and then back again after 145-140 Ma, coincident with the transition from contractional to extensional deformation regime in the very early Cretaceous. Distinct trends in lithologies, geochemistry and Nd-Hf isotopes as a function of age and location are also observed in these magmas. The Mesozoic magmatism and deformation, as well as the lithospheric destruction, across the northern North China Craton is interpreted as the consequence of a change in subduction geodynamic regime of the Paleo-Pacific slab and its interaction with overlying continental lithosphere, which involves an active continental arc at Korean and Liaodong Peninsulas in the early-middle Jurassic, progressive shallowing of the subducting Paleo-Pacific plate in the middle-late Jurassic, and subsequent slab rollback in the early Cretaceous. Considering that trench retreat and slab-roll back are demonstrated as the pre-request of slab stagnation in the mantle transition zone, we further propose that the big mantle wedge structure in East Asia was probably initiated at 145-140 Ma and was likely fully developed by similar to 120 Ma. Such a peculiar deep mantle structure governed the post-Cretaceous evolution of the Asian continental lithosphere by mediating the chemical and physical properties of upper mantle.

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标题: A High-Precision Aerosol Retrieval Algorithm (HiPARA) for Advanced Himawari Imager (AHI) data: Development and verification

作者: Su, X (Su, Xin); Wang, LC (Wang, Lunche); Zhang, M (Zhang, Ming); Qin, WM (Qin, Wenmin); Bilal, M (Bilal, Muhammad)

来源出版物: REMOTE SENSING OF ENVIRONMENT 卷: 253 文献号: 112221 DOI: 10.1016/j.rse.2020.112221 出版年: FEB 2021

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摘要: Due to the complexity of land cover and aerosol types, the high-precision retrieval of land aerosol properties is challenging. A land general aerosol (LaGA) algorithm called the High-Precision Aerosol Retrieval Algorithm (HiPARA) is proposed for the Advanced Himawari Imager (AHI) sensor over East Asia. In this algorithm, a monthly spectral base reflectance ratio library was constructed to obtain a pixel-by-pixel spectral reflectance relationship model. Statistical methods were used to obtain aerosol types in China, and a linearization scheme for the aerosol types was proposed based on sensitivity analysis. Based on these techniques, HiPARA achieved a completely dynamic determination of the surface reflectance and aerosol types. The new multiband aerosol characteristic retrieval strategy can return two parameters, aerosol optical depth (AOD) and single scattering albedo (SSA). The AOD retrieved from HiPARA showed high consistency with AERONET AOD measurements, with correlation coefficients (R) of 0.939, a mean absolute error (MAE) of 0.082, a root mean square error (RMSE) of 0.113, ratios that meet an expected error (EE) of 0.825, and ratios that meet a Global Climate Observing System (GCOS) error of 0.339. Comparison of the HiPARA retrieved AOD with other operational aerosol products revealed that the accuracy of the HiPARA product was better than those of the Japan Aerospace Exploration Agency (JAXA) product (R < 0.9, RMSE > 0.175), Moderate-resolution Imaging Spectro-radiometer (MODIS) products (Dark Target (DT) algorithm, R = 0.907, RMSE = 0.203; Deep Blue (DB) algorithm, R = 0.909, RMSE = 0.139) and Visible/Infrared Imager Radiometer Suite (VIIRS) AERDB product (R = 0.932, RMSE = 0.117). The HiPARA fitting line was close to 1:1 (i.e., y = x). The aerosol products were further evaluated for four extreme aerosol events: a smoke aerosol event, a haze aerosol event, a dust aerosol event, and a continuous aerosol variation event. Observation of the true-color images and AOD retrievals showed that the HiPARA AOD distribution matched the true-color images very well. The JAXA product had abnormal values and spatial discontinuities. The MODIS and VIIRS products were not as good as the HiPARA product in terms of spatial coverage. In the application to continuous monitoring of a dust event, the HiPARA AOD captured the variations in and intensity of the dust aerosols very well. These results suggested the robustness of HiPARA and its potential for monitoring extreme pollution events with high precision and high temporal resolution.

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标题: Young lunar mare basalts in the Chang'e-5 sample return region, northern Oceanus Procellarum

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摘要: Chang'e-5, China's first lunar sample return mission, is targeted to land in northern Oceanus Procellarum, within a region selected on the basis of 1) its location away from the Apollo-Luna sampling region, 2) the presence of the Procellarum KREEP Terrane (PKT), 3) the occurrence of one of the youngest lunar mare basalts (Em4), and 4) its association with Rima Sharp. In order to provide context for returned sample analyses, we conducted a comprehensive study of the regional and global settings, geomorphology, composition, mineralogy, and chronology of the Em4 mare basalts. Superposed on Imbrian-aged low-Ti basalts, Em4 covers 37,000 km(2) and is composed of Eratosthenian-aged (similar to 1.53 Ga), high-Ti basalts with a mean thickness of similar to 51 m and a volume between similar to 1450 and 2350 km(3). Minor variations in TiO2 and FeO abundance occur within the unit and the thorium content averages similar to 6.7 ppm, typical of PKT mare basaltic regolith. No specific source vents (e.g., fissures, cones, domes) were found within the unit. We show that Rima Sharp is actually composed of three major rilles, whose source vents are located outside of, and which flow into, and merge in Em4, suggesting that they may be among the sources for Em4. Regolith thickness averages similar to 7 m and there is abundant evidence for vertical and lateral mixing; the most likely sources of distal ejecta are Aristarchus, Harpalus, and Sharp B craters. Returned samples from local and distant materials delivered by impact will thus provide significant new insights into lunar geochronology, inner Solar System impact fluxes, the age of very young mare basalts, the role of the PKT in the generation of mare basalts, the role of sinuous rilles in lava flow emplacement, and the thermal evolution of the Moon. (C) 2020 Elsevier B.V. All rights reserved.

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第 239 条，共 300 条

标题: Source apportionment of volatile organic compounds: Implications to reactivity, ozone formation, and secondary organic aerosol potential

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摘要: Volatile organic compounds (VOCs) are important contributors to atmospheric chemical reactivity rate (L-OH), ozone formation potential (OFP), and secondary organic aerosol formation potential (SOAP). The purpose of this study was to determine the contributions of different VOC sources to L-OH, OFP, and SOAP using positive matrix factorization (PMF) model. Hourly observation of ambient VOCs at a megacity of Central China was conducted for one month in winter. The L-OH, OFP, and SOAP of VOC species were firstly estimated. The PMF model was then used to apportion their sources. Five VOC sources including solvent usage, gasoline evaporation, combustion sources, vehicle emissions, and industrial sources were apportioned with their average contributions of 11.6%, 14.2%, 39.0%, 22.5%, and 12.6%, respectively. Industrial sources were the highest contributors to the L-OH and SOAP with average contributions of 32.2% and 32.8%, respectively, while vehicle emissions contributed most to the OFP (27.8%). This study highlighted that the VOCs and ozone pollution control should give priority to the reactivity (OFP and SOAP) based strategies rather than concentration contribution-based strategies.

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第 240 条，共 300 条

标题: Importance of meteorology in air pollution events during the city lockdown for COVID-19 in Hubei Province, Central China

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来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 754 文献号: 142227 DOI: 10.1016/j.scitotenv.2020.142227 出版年: FEB 1 2021

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摘要: Compared with the 21-year climatological mean over the same period during 2000-2020, the aerosol optical depth (AOD) and Angstrom exponent (AE) during the COVID-19 lockdown (January 24-February 29, 2020) decreased and increased, respectively, in most regions of Central-Eastern China (CEC). The AOD (AE) values decreased (increased) by 39.2% (29.4%) and 31.0% (45.3%) in Hubei and Wuhan, respectively, because of the rigorous restrictions. These inverse changes reflected the reduction of total aerosols in the air and the contribution of the increase in fine-mode particles during the lockdown. The surface PM2.5 had a distinct spatial distribution over CEC during the lockdown, with high concentrations in North China and East China. In particular, relatively high PM2.5 concentrations were notable in the lower flatlands of Hubei Province in Central China, where six PM2.5 pollution events were identified during the lockdown. Using the observation data and model simulations, we found that 50% of the pollution episodes were associated with the long-range transport of air pollutants from upstream CEC source regions, which then converged in the downstream Hubei receptor region. However, local pollution was dominant for the remaining episodes because of stagnant meteorological conditions. The long-range transport of air pollutants substantially contributed to PM2.5 pollution in Hubei, reflecting the exceptional importance of meteorology in regional air quality in China. (C) 2020 Elsevier B.V. All rights reserved.

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第 241 条，共 300 条

标题: Lucas-Washburn Equation-Based Modeling of Capillary-Driven Flow in Porous Systems

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摘要: Fluid flow in porous systems driven by capillary pressure is one of the most ubiquitous phenomena in nature and industry, including petroleum and hydraulic engineering as well as material and life sciences. The classical Lucas-Washburn (LW) equation and its modified forms were developed and have been applied extensively to elucidate the fundamental mechanisms underlying the basic statics and dynamics of the capillary-driven flow in porous systems. The LW equation assumes that fluids are incompressible Newton ones and that capillary channels all have the same radii. This kind of hypothesis is not true for many natural situations, however, where porous systems comprise complicated pore and capillary channel structures at microscales. The LW equation therefore often leads to inaccurate capillary imbibition predictions in such situations. Numerous studies have been conducted in recent years to develop and assess the modifications and extensions of the LW equation in various porous systems. Significant progresses in computational techniques have also been attained to further improve our understanding of imbibition dynamics. A state-of-the-art review is therefore needed to summarize the recent significant models and numerical simulation techniques as well as to discuss key ongoing research topics arising from various new engineering practices. The theoretical basis of the LW equation is first introduced in this review and recent progress in mathematical models is then summarized to demonstrate the modifications and extensions of this equation to various microchannels and porous media. These include capillary tubes with nonuniform and noncircular cross sections, discrete fractures, and capillary tubes that are not straight as well as heterogeneous porous media. Numerical studies on the LW equation are also reviewed, and comments on future works and research directions for LW-based capillary-driven flows in porous systems are listed.

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第 242 条，共 300 条

标题: Photocatalysis Enhanced by External Fields

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来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 60 期: 30 页: 16309-16328 DOI: 10.1002/anie.202009518 提前访问日期: JAN 2021 出版年: JUL 19 2021

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摘要: The efficient conversion of solar energy by means of photocatalysis shows huge potential to relieve the ongoing energy crisis and increasing environmental pollution. However, unsatisfactory conversion efficiency still hinders its practical application. The introduction of external fields can remarkably enhance the photocatalytic performance of semiconductors from the inside out. This review focuses on recent advances in the application of diverse external fields, including microwaves, mechanical stress, temperature gradient, electric field, magnetic field, and coupled fields, to boost photocatalytic reactions, for applications in, for example, contaminant degradation, water splitting, CO2 reduction, and bacterial inactivation. The relevant reinforcement mechanisms of photoabsorption, the transport and separation of photoinduced charges, and adsorption of reagents by the external fields are highlighted. Finally, the challenges and outlook for the development of external-field-enhanced photocatalysis are presented.

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输出日期: 2023-09-04

第 243 条，共 300 条

标题: The Eocene-Oligocene transition: a review of marine and terrestrial proxy data, models and model data comparisons

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来源出版物: CLIMATE OF THE PAST 卷: 17 期: 1 页: 269-315 DOI: 10.5194/cp-17-269-2021 出版年: JAN 28 2021

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摘要: The Eocene-Oligocene transition (EOT) was a climate shift from a largely ice-free greenhouse world to an icehouse climate, involving the first major glaciation of Antarctica and global cooling occurring similar to 34 million years ago (Ma) and lasting similar to 790 kyr. The change is marked by a global shift in deep-sea delta O-18 representing a combination of deep-ocean cooling and growth in land ice volume. At the same time, multiple independent proxies for ocean temperature indicate sea surface cooling, and major changes in global fauna and flora record a shift toward more cold-climateadapted species. The two principal suggested explanations of this transition are a decline in atmospheric CO2 and changes to ocean gateways, while orbital forcing likely influenced the precise timing of the glaciation. Here we review and synthesise proxy evidence of palaeogeography, temperature, ice sheets, ocean circulation and CO2 change from the marine and terrestrial realms. Furthermore, we quantitatively compare proxy records of change to an ensemble of climate model simulations of temperature change across the EOT. The simulations compare three forcing mechanisms across the EOT: CO2 decrease, palaeogeographic changes and ice sheet growth. Our model ensemble results demonstrate the need for a global cooling mechanism beyond the imposition of an ice sheet or palaeogeographic changes. We find that CO2 forcing involving a large decrease in CO2 of ca. 40 % (similar to 325 ppm drop) provides the best fit to the available proxy evidence, with ice sheet and palaeogeographic changes playing a secondary role. While this large decrease is consistent with some CO2 proxy records (the extreme endmember of decrease), the positive feedback mechanisms on ice growth are so strong that a modest CO2 decrease beyond a critical threshold for ice sheet initiation is well capable of triggering rapid ice sheet growth. Thus, the amplitude of CO2 decrease signalled by our data-model comparison should be considered an upper estimate and perhaps artificially large, not least because the current generation of climate models do not include dynamic ice sheets and in some cases may be undersensitive to CO2 forcing. The model ensemble also cannot exclude the possibility that palaeogeographic changes could have triggered a reduction in CO2.

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第 244 条，共 300 条

标题: A review on state of health estimations and remaining useful life prognostics of lithium-ion batteries

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摘要: Lithium-ion batteries have been generally used in industrial applications. In order to ensure the safety of the power system and reduce the operation cost, it is particularly important to accurately and timely estimate the state of health (SOH) and predict the remaining useful life (RUL) of lithium-ion batteries. With the development of intelligent tools such as artificial intelligence, big data analysis and the Internet of Things, the methods of battery health assessment have been gradually diversified. Here, we have compiled four publicly available battery datasets. The SOH estimations and RUL prognostics of lithium-ion batteries are reviewed by analyzing the research status. To this end, after studying different scientific and technical literatures, the respective methods are divided into specific groups, and the advantages and limitations of the battery management system application are discussed. At the end, the future development trend and research challenges are analyzed. All key insights in this review will hopefully drive the development of battery health estimation and life prediction techniques.

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第 245 条，共 300 条

标题: Atomic-Level Charge Separation Strategies in Semiconductor-Based Photocatalysts

作者: Chen, F (Chen, Fang); Ma, TY (Ma, Tianyi); Zhang, TR (Zhang, Tierui); Zhang, YH (Zhang, Yihe); Huang, HW (Huang, Hongwei)

来源出版物: ADVANCED MATERIALS 卷: 33 期: 10 文献号: 2005256 DOI: 10.1002/adma.202005256 提前访问日期: JAN 2021 出版年: MAR 2021

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摘要: Semiconductor-based photocatalysis as a productive technology furnishes a prospective solution to environmental and renewable energy issues, but its efficiency greatly relies on the effective bulk and surface separation of photoexcited charge carriers. Exploitation of atomic-level strategies allows in-depth understanding on the related mechanisms and enables bottom-up precise design of photocatalysts, significantly enhancing photocatalytic activity. Herein, the advances on atomic-level charge separation strategies toward developing robust photocatalysts are highlighted, elucidating the fundamentals of charge separation and transfer processes and advanced probing techniques. The atomic-level bulk charge separation strategies, embodied by regulation of charge movement pathway and migration dynamic, boil down to shortening the charge diffusion distance to the atomic-scale, establishing atomic-level charge transfer channels, and enhancing the charge separation driving force. Meanwhile, regulating the in-plane surface structure and spatial surface structure are summarized as atomic-level surface charge separation strategies. Moreover, collaborative strategies for simultaneous manipulation of bulk and surface photocharges are also introduced. Finally, the existing challenges and future prospects for fabrication of state-of-the-art photocatalysts are discussed on the basis of a thorough comprehension of atomic-level charge separation strategies.

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第 246 条，共 300 条

标题: Novel Pathway for Vanadium(V) Bio-Detoxification by Gram-Positive Lactococcus raffinolactis

作者: Zhang, BG (Zhang, Baogang); Li, YN (Li, Yi'na); Fei, YM (Fei, Yangmei); Cheng, YT (Cheng, Yutong)

来源出版物: ENVIRONMENTAL SCIENCE & TECHNOLOGY 卷: 55 期: 3 页: 2121-2131 DOI: 10.1021/acs.est.0c07442 提前访问日期: JAN 2021 出版年: FEB 2 2021

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摘要: Whereas prospects of bioremediation for a vanadium(V) [V(V)]-contaminated environment are widely recognized, reported functional species are extremely limited, with the vast majority of Gram-negative bacteria in Proteobacteria. Herein, the effectiveness of V(V) reduction is proved for the first time by Lactococcus raffinolactis, a Gram-positive bacterium in Firmicutes. The V(V) removal efficiency was 86.5 +/- 2.17% during 10-d operation, with an average removal rate of 4.32 +/- 0.28 mg/L.d in a citrate-fed system correspondingly. V(V) was bio-reduced to insoluble vanadium(IV) and distributed both inside and outside the cells. Nitrite reductase encoded by gene nirS mainly catalyzed intracellular V(V) reduction, revealing a previously unrecognized pathway. Oxidative stress induced by reactive oxygen species from dissimilatory V(V) reduction was alleviated through strengthened superoxide dismutase and catalase activities. Extracellular polymeric substances with chemically reactive hydroxyl (-OH) and carboxyl (-COO-) groups also contributed to V(V) binding and reduction as well as ROS scavenging. This study can improve the understanding of Gram-positive bacteria for V(V) bio-detoxification and offer microbial resources for bioremediation of a V(V)-polluted environment.

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第 247 条，共 300 条

标题: Cenozoic lithospheric architecture and metallogenesis in Southeastern Tibet

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来源出版物: EARTH-SCIENCE REVIEWS 卷: 214 文献号: 103472 DOI: 10.1016/j.earscirev.2020.103472 提前访问日期: JAN 2021 出版年: MAR 2021

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被引频次合计: 55

摘要: Ore systems are located in zones of enhanced and focused heat and fluids flux within the lithosphere. In order to target deep ore deposits under cover, a better understanding of lithospheric architecture is essential, especially in relation to magmatism and fluids. Here we attempt an integrated approach using zircon Lu-Hf isotopic mapping (455 samples with 5049 zircon analyses, including 1021 new data), combined with whole-rock geochemistry and isotopes of mantle-derived mafic rocks, high-resolution seismic tomography from 325 seismic stations and new thermochemical modelling, to establish the lithosphere architecture in southeastern Tibet. The integrated data suggest lithospheric refertilisation accompanied by heat flux from the asthenosphere, and also reveal the evolutionary pathway of the volatile components. The approach adopted in our study can be used in exploration for porphyry Cu-Au, orogenic-Au and rare earth element deposits in Southeastern Tibet, and illustrate the usefulness of lithosphere-architecture mapping as a useful tool for mineral exploration.

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第 248 条，共 300 条

标题: Phase stability and superconductivity of lead hydrides at high pressure

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来源出版物: PHYSICAL REVIEW B 卷: 103 期: 3 文献号: 035131 DOI: 10.1103/PhysRevB.103.035131 出版年: JAN 19 2021

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摘要: Density functional theory calculations and crystal structure predictions using the particle swarm optimization method have been combined to determine stable hydrides of lead under pressure. In contrast to other group-IVa hydrides, the stoichiometry PbH6 is the first hydride to become stable, at just under 1 Mbar. For two previously studied stoichiometries, PbH4 and PbH8, energetically more favorable phases were identified to become stable around 2 Mbar. In all structures, the hydrogenic sublattices comprise negatively charged H-2(delta-) molecules. Competitive PbH4 and PbH6 structures are layered. PbH6 features H-2 molecules intercalated between hcp Pb layers, the stable phase of dense pure lead, thus offering a potentially straightforward route towards synthesis. In PbH8, the Pb lattice adapts a beta-Sn structure, and hydrogen atoms form quasi-one-dimensional-chains. All structures were found to be metallic and to feature superconductivity in their respective stability range, with moderately high T-c in the range 60-100 K for PbH4 and PbH6 and 161-178 K for PbH8.

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标题: Drought effects on soil carbon and nitrogen dynamics in global natural ecosystems

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摘要: Extreme droughts have serious impacts on the pools, fluxes and processes of terrestrial carbon (C) and nitrogen (N) cycles. A deep understanding is necessary to explore the impacts of this extreme climate change events. To investigate how soil C and N pools and fluxes respond to drought and explore their mechanisms we conducted a meta-analysis synthesizing the responses of soil C and N cycles to droughts (precipitation reduction experiments) in three main natural ecosystems: forests, shrubs and grasslands. Data were collected from 148 recent publications (1815 sampling data at 134 sites) with the drought experiments from 1 to 13 years across the globe. Drought reduced soil organic C content (-3.3%) mainly because of decreased plant litter input (-8.7%) and reduced litter decomposition (-13.0%) across all the three ecosystem types in the world. Drought increased mineral N content (+31%) but reduced N mineralization rate (-5.7%) and nitrification rate (-13.8%), and thus left total N unchanged. Compared with the local precipitation, drought increased the accumulation of dissolved organic C and N contents by +59% and +33%, respectively, due to retarded mineralization and higher stability of dissolved organic matter. Among the three ecosystem types, forest soils strongly increased litter C (+64%, n=8) and N content (+33%, n=6) as well as microbial CO2 (+16%, n=55), whereas total CO2 emission remains unaffected. Drought decreased soil CO2 emission (-15%, n=53) in shrubs due to reduction of microbial respiration and decreased root biomass. The 98% (n=39) increase of NH4+ concentration in forest soils corresponds to 11% (n=37) decrease of NO3- and so, it reflected the increase of N mineralization rate, but the decrease of nitrification. For shrubs and grasslands, however, stabilized or decreased N mineralization and nitrification mean less N uptake by plants under drought. Overall, the effects of drought on soil C and N cycles were regulated by the ecosystem type, drought duration and intensity. The drought intensity and duration intensify all effects, especially on the decreasing total (CO2) emission. However, the most studies mainly focused on the short-term droughts, and there is a lack of comprehensive understanding of how drought effects in a long-term consequences. So, future studies should strengthen drought frequency impacts on ecosystem C and N dynamics in the long-term sequence (> 10 years) in order to face the impacts of global change.

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标题: Self-Guiding Polymeric Prodrug Micelles with Two Aggregation-Induced Emission Photosensitizers for Enhanced Chemo-Photodynamic Therapy

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摘要: Nowadays, aggregation-induced emission luminogens (AIEgens) with reactive oxygen species (ROS) generating ability have been used as photosensitizers for imaging guided photodynamic therapy (PDT). To achieve enhanced antitumor outcomes, combining AIEgens-based PDT with chemotherapy is an efficient strategy. However, the therapeutic efficiency is hampered by the limited cellular uptake efficiency and the appropriate light irradiation occasion. In this paper, a self-guiding polymeric micelle (TB@PMPT) composed of two AIE photosensitizers and a reduction-sensitive paclitaxel prodrug (PTX-SS-N-3) was established for enhanced chemo-photodynamic therapy by a dual-stage light irradiation strategy. When the micelles were accumulated in tumor tissues, the first light irradiation (L-1, 6 min) was utilized to facilitate cellular uptake by "photochemical internalization" (PCI). Then, the intracellular glutathione (GSH) would induce the PTX release, micelles disassembly and the aggregation state change of AIEgens. The fluorescence signal change of two AIEgens-based ratiometric fluorescent probe could not only precisely guide the second light irradiation (L-2, 18 min) for sufficient ROS production, but also monitor the nonfluorescent drug PTX release in turn. Both in vivo and in vitro studies demonstrated that the dual-stage light irradiation strategy employed for TB@PMPT micelles exhibited a superior therapeutic effect over only 24 min continuous light irradiation.

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标题: DeepMIP: model intercomparison of early Eocene climatic optimum (EECO) large-scale climate features and comparison with proxy data

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摘要: We present results from an ensemble of eight climate models, each of which has carried out simulations of the early Eocene climate optimum (EECO, similar to 50 million years ago). These simulations have been carried out in the framework of the Deep-Time Model Intercomparison Project (DeepMIP; http://www.deepmip.org , last access: 10 January 2021); thus, all models have been configured with the same paleogeographic and vegetation boundary conditions. The results indicate that these non-CO2 boundary conditions contribute between 3 and 5 degrees C to Eocene warmth. Compared with results from previous studies, the DeepMIP simulations generally show a reduced spread of the global mean surface temperature response across the ensemble for a given atmospheric CO2 concentration as well as an increased climate sensitivity on average. An energy balance analysis of the model ensemble indicates that global mean warming in the Eocene compared with the preindustrial period mostly arises from decreases in emissivity due to the elevated CO2 concentration (and associated water vapour and long-wave cloud feedbacks), whereas the reduction in the Eocene in terms of the meridional temperature gradient is primarily due to emissivity and albedo changes owing to the non-CO2 boundary conditions (i.e. the removal of the Antarctic ice sheet and changes in vegetation). Three of the models (the Community Earth System Model, CESM; the Geophysical Fluid Dynamics Laboratory, GFDL, model; and the Norwegian Earth System Model, NorESM) show results that are consistent with the proxies in terms of the global mean temperature, meridional SST gradient, and CO2, without prescribing changes to model parameters. In addition, many of the models agree well with the first-order spatial patterns in the SST proxies. However, at a more regional scale, the models lack skill. In particular, the modelled anomalies are substantially lower than those indicated by the proxies in the southwest Pacific; here, modelled continental surface air temperature anomalies are more consistent with surface air temperature proxies, implying a possible inconsistency between marine and terrestrial temperatures in either the proxies or models in this region. Our aim is that the documentation of the large-scale features and model-data comparison presented herein will pave the way to further studies that explore aspects of the model simulations in more detail, for example the ocean circulation, hydrological cycle, and modes of variability, and encourage sensitivity studies to aspects such as paleogeography, orbital configuration, and aerosols.

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标题: Large-scale features of Last Interglacial climate: results from evaluating the lig127k simulations for the Coupled Model Intercomparison Project (CMIP6)-Paleoclimate Modeling Intercomparison Project (PMIP4)

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摘要: The modeling of paleoclimate, using physically based tools, is increasingly seen as a strong out-of-sample test of the models that are used for the projection of future climate changes. New to the Coupled Model Intercomparison Project (CMIP6) is the Tier 1 Last Interglacial experiment for 127 000 years ago (lig127k), designed to address the climate responses to stronger orbital forcing than the mid-Holocene experiment, using the same state-of-the-art models as for the future and following a common experimental protocol. Here we present a first analysis of a multi-model ensemble of 17 climate models, all of which have completed the CMIP6 DECK (Diagnostic, Evaluation and Characterization of Klima) experiments. The equilibrium climate sensitivity (ECS) of these models varies from 1.8 to 5.6 degrees C. The seasonal character of the insolation anomalies results in strong summer warming over the Northern Hemisphere continents in the lig127k ensemble as compared to the CMIP6 piControl and much-reduced minimum sea ice in the Arctic. The multi-model results indicate enhanced summer monsoonal precipitation in the Northern Hemisphere and reductions in the Southern Hemisphere. These responses are greater in the lig127k than the CMIP6 midHolocene simulations as expected from the larger insolation anomalies at 127 than 6 ka.

New synthesis for surface temperature and precipitation, targeted for 127 ka, have been developed for comparison to the multi-model ensemble. The lig127k model ensemble and data reconstructions are in good agreement for summer temperature anomalies over Canada, Scandinavia, and the North Atlantic and for precipitation over the Northern Hemisphere continents. The model-data comparisons and mismatches point to further study of the sensitivity of the simulations to uncertainties in the boundary conditions and of the uncertainties and sparse coverage in current proxy reconstructions.

The CMIP6-Paleoclimate Modeling Intercomparison Project (PMIP4) lig127k simulations, in combination with the proxy record, improve our confidence in future projections of monsoons, surface temperature, and Arctic sea ice, thus providing a key target for model evaluation and optimization.

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标题: A critical review on the electrospun nanofibrous membranes for the adsorption of heavy metals in water treatment

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摘要: Electrospun nanofibrous membranes (ENFMs) have many superior advantages, such as large specific surface area, high porosity, easy modification, good flexibility, and easy separation for recycling, which are consider as excellent adsorbents. In this paper, the research progress in the adsorption of heavy metals in water treatment by ENFMs is reviewed. Three types of ENFMs, including organic polymer ENFMs, organic polymer/inorganic material composite ENFMs and inorganic ENFMs are summarized, and their adsorption capacities for heavy metals in water are compared. The adsorption selectivity and capacity of ENFMs for heavy metals are depended largely on the type and number of functional groups on the surface of membranes, and usually the more the functional groups, the higher the adsorption capacity. The adsorption mechanisms of ENFMs are also mainly determined by the type of functional groups on the membrane. At present, the main challenge is to achieve the mass production of high-quality nanofibers and their actual application in the treatment of heavy metal-containing wastewater. Therefore, more consideration should be focused on the improvement of stability, mechanical strength and reusability of ENFMs. This review may provide an insight for the development of ENFMs-based adsorbents for heavy metals separation and water purification in the future.

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标题: Common Problems and Pitfalls in Fluid Inclusion Study: A Review and Discussion

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摘要: The study of fluid inclusions is important for understanding various geologic processes involving geofluids. However, there are a number of problems that are frequently encountered in the study of fluid inclusions, especially by beginners, and many of these problems are critical for the validity of the fluid inclusion data and their interpretations. This paper discusses some of the most common problems and/or pitfalls, including those related to fluid inclusion petrography, metastability, fluid phase relationships, fluid temperature and pressure calculation and interpretation, bulk fluid inclusion analysis, and data presentation. A total of 16 problems, many of which have been discussed in the literature, are described and analyzed systematically. The causes of the problems, their potential impact on data quality and interpretation, as well as possible remediation or alleviation, are discussed.

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标题: Understanding the drivers of sustainable land expansion using a patch-generating land use simulation (PLUS) model: A case study in Wuhan, China

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摘要: Cellular Automata (CA) are widely used to model the dynamics within complex land use and land cover (LULC) systems. Past CA model research has focused on improving the technical modeling procedures, and only a few studies have sought to improve our understanding of the nonlinear relationships that underlie LULC change. Many CA models lack the ability to simulate the detailed patch evolution of multiple land use types. This study introduces a patch-generating land use simulation (PLUS) model that integrates a land expansion analysis strategy and a CA model based on multi-type random patch seeds. These were used to understand the drivers of land expansion and to investigate the landscape dynamics in Wuhan, China. The proposed model achieved a higher simulation accuracy and more similar landscape pattern metrics to the true landscape than other CA models tested. The land expansion analysis strategy also uncovered some underlying transition rules, such as that grassland is most likely to be found where it is not strongly impacted by human activities, and that deciduous forest areas tend to grow adjacent to arterial roads. We also projected the structure of land use under different optimizing scenarios for 2035 by combining the proposed model with multi-objective programming. The results indicate that the proposed model can help policymakers to manage future land use dynamics and so to realize more sustainable land use patterns for future development. Software for PLUS has been made available at https//gitub.com/HPSCIL/patch-generating\_Land\_Use\_Simulation\_Model

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第 256 条，共 300 条

标题: Superpixel-Based Reweighted Low-Rank and Total Variation Sparse Unmixing for Hyperspectral Remote Sensing Imagery

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来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 59 期: 1 页: 629-647 DOI: 10.1109/TGRS.2020.2994260 出版年: JAN 2021

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摘要: Sparse unmixing, as a semisupervised unmixing method, has attracted extensive attention. The process of sparse unmixing involves treating the mixed pixels of hyperspectral imagery as a linear combination of a small number of spectral signatures (endmembers) in a standard spectral library, associated with fractional abundances. Over the past ten years, to achieve a better performance, sparse unmixing algorithms have begun to focus on the spatial information of hyperspectral images. However, less accurate spatial information greatly limits the performance of the spatial-regularization-based sparse unmixing algorithms. In this article, to overcome this limitation and obtain more reliable spatial information, a novel sparse unmixing algorithm named superpixel-based reweighted low-rank and total variation (SUSRLR-TV) is proposed to enhance the performance of the traditional spatial-regularization-based sparse unmixing approaches. In the proposed approach, superpixel segmentation is adopted to consider both the spatial proximity and the spectral similarity. In addition, a low-rank constraint is enforced on the objective function as pixels within each superpixel have the same endmembers and similar abundance values, and they naturally satisfy the low-rank constraint. Differing from the traditional nuclear norm, a reweighted nuclear norm is used to achieve a more efficient and accurate low-rank constraint. Meanwhile, low-rank consideration is also used to enhance the spatial continuity and suppress the effects of random noise. Furthermore, TV regularization is introduced to promote the smoothness of the abundance maps. Experiments on three simulated data sets, as well as a well-known real hyperspectral imagery data set, confirm the superior performance of the proposed method in both the qualitative assessment and the quantitative evaluation, compared with the state-of-the-art sparse unmixing methods.

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第 257 条，共 300 条

标题: Mixed-cell cellular automata: A new approach for simulating the spatio-temporal dynamics of mixed land use structures

作者: Liang, X (Liang, Xun); Guan, QF (Guan, Qingfeng); Clarke, KC (Clarke, Keith C.); Chen, GZ (Chen, Guangzhao); Guo, S (Guo, Song); Yao, Y (Yao, Yao)

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摘要: When used for land use change modeling, Cellular Automata (CA) usually assume that each cell has only one land use type at each time step, ignoring the mixed land use structures that are often found in land units. Mixed cells, composed of cover proportions of multiple land use types, provide a new perspective for modeling the spatio-temporal dynamics of mixed land use structures. Simulating land use change with mixed cells is challenging because mixed-cell CAs are fundamentally different from conventional CAs. This study develops a mixed cell CA (MCCA). The structure of the CA is re-designed based on the cover proportion of land uses, including the representations of cell state, lattice, and neighborhood. The transition rules are automatically constructed by random-forest regression using historical data and a competition mechanism among multiple land use types at the sub-cell scale is proposed. In addition, a mixed-cell figure of merit (mcFoM) accuracy measure is proposed to validate the MCCA. The MCCA was applied to the Wuhan metropolitan area in China, and the results show that the MCCA was able to simulate the subtle changes of land use proportions within land units. The MCCA represents a new breed of geospatial CA models for spatio-temporal dynamics of mixed land use structures, which enables mixed land use research to leap from static analysis to dynamic simulation.

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第 258 条，共 300 条

标题: Onset of plate tectonics by the Eoarchean

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摘要: One of the most contentious areas of Earth Science today is when, or whether or not modern-style plate tectonics was in operation in the Archean Eon. In this review we present evidence that the onset of plate tectonics was not at 3.2 Ga, as popularly conceived, but was in operation during the Eoarchean by at least ca. 4.0 Ga. Following a review of the main Eoarchean supracrustal belts of the world, constrained by relevant geochemical/isotopic data, we present evidence that suggests that from at least ca. 4.0 Ga Earth produced considerable juvenile mafic crust and consequent island arcs by Accretionary Cycle Plate Tectonics. From similar to 3.2 Ga there was a gradual transition in geodynamics to more abundant active continental margin magmatism in the form of voluminous TTGs and sanukitoids. From 3.2 Ga to 2.5 Ga juvenile oceanic crust and arcs continued to form, accompanied by more active continental margin magmatism until similar to 2.7-2.5 Ga, by which time there were sufficient crustal rocks to amalgamate into incipient large continents, the fragmentation of which started the first complete classical Wilson Cycle Plate Tectonics of breaking apart and re-assembling large continental masses. In other words, there were two types of plate tectonics in operation in the early Earth, Accretionary Cycle Plate Tectonics and Wilson Cycle Plate Tectonics, but Wilson Cycle type plate interactions only became more common after contiguous continental landmass became voluminous and extensive enough around 2.7-2.5 Ga. Failure to realize this dual mechanism of continental growth may lead to erroneous ideas such as "plate tectonics started at 3.2 Ga", or "mantle plumes generated early Archean magmatic rocks." We present new geochemical data that together with lithological and structural relationships, negate the various plume-type speculations including stagnant lids, heat pipes, and mushy-lid tectonics. It is interesting to consider that the way Earth's crust developed in the first Gigayear of the geological record continued later, albeit in more advanced forms, into the Phanerozoic, where we can still recognize Accretionary Cycle Plate Tectonics and orogens still with short boundaries in examples including the Altaids of Central Asia, the Arabian-Nubian Shield, the Japanese Islands, and in incipient form in Indonesia, as well as Wilson Cycle Plate Tectonics that leads inexorably to continental collisions as in the Alpine-Himalayan orogen with its long plate boundaries. We recommend this holistic view of crustal growth and the evolution of continents that leads to a robust, viable, and testable model of Earth evolution.

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标题: Inside-and-Out Semiconductor Engineering for CO2 Photoreduction: From Recent Advances to New Trends

作者: Wang, SB (Wang, Shuobo); Han, X (Han, Xu); Zhang, YH (Zhang, Yihe); Tian, N (Tian, Na); Ma, TY (Ma, Tianyi); Huang, HW (Huang, Hongwei)

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摘要: Photocatalytic CO2 reduction attracts substantial interests for the production of chemical fuels via solar energy conversion, but the activity, stability, and selectivity of products were severely determined by the efficiencies of light harvesting, charge migration, and surface reactions. Structural engineering is a promising tactic to address the aforementioned crucial factors for boosting CO2 photoreduction. Herein, a timely and comprehensive review focusing on the recent advances in photocatalytic CO2 conversion based on the design strategies over nano-/microstructure, crystalline and band structure, surface structure and interface structure is provided, which covers both the thermodynamic and kinetic challenges in CO2 photoreduction process. The key parameters essential for tailoring the size, morphology, porosity, bandgap, surface, or interfacial properties of photocatalysts are emphasized toward the efficient and selective conversion of CO2 into valuable chemicals. New trends and strategies in the structural design to meet the demands for prominent CO2 photoreduction activity are also introduced. It is expected to furnish a comprehensive guideline for inside-and-out design of state-of-the-art photocatalysts with well-defined structures for CO2 conversion.

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标题: Nitrogen dopants in nickel nanoparticles embedded carbon nanotubes promote overall urea oxidation

作者: Zhang, Q (Zhang, Quan); Kazim, FMD (Kazim, Farhad M. D.); Ma, SX (Ma, Shuangxiu); Qu, KG (Qu, Konggang); Li, M (Li, Min); Wang, YG (Wang, Yangang); Hu, H (Hu, Hao); Cai, WW (Cai, Weiwei); Yang, ZH (Yang, Zehui)

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摘要: Urea electro-oxidation is an attractive and alternative anodic reaction in the electrochemical generation of hydrogen using wastewater ascribing to the low theoretical voltage and non-precious metal (nickel) catalyst for urea oxidation reaction (UOR); however, the sluggish UOR and poisoning of catalyst impede the practical application. Here, in this work, we synthesize a series of nickel nanoparticles embedded nitrogen doped carbon nanotubes (Ni@NCNT) and study the effect of nitrogen dopants on UOR catalytic activity. The nitrogen dopants can weaken the binding strength between CO2 species and active sites resulting in alleviation of CO2 poisoning; simultaneously, nitrogen dopants also promote the in-situ conversion of Ni3+ species facilitating UOR catalysis; as a result, electrocatalytic current density of 45.8 mA cm(-2) is recorded for Ni@NCNT in 1 M KOH electrolyte with 0.5 M urea at 1.5 V vs. RHE, which is 3.8 fold better than commercial PVC (11.8 mA cm(-2)). Moreover, Ni@ NCNT, due to the more nitrogen dopants, exhibits a comparable overpotential to commercial PVC for driving hydrogen evolution reaction (HER) catalysis in 1 M KOH electrolyte at high current density (400 mA cm(-2)). Subsequently, 1.56 V is demanded for overall UOR catalysis on Ni@NCNT with current density of 10 mA cm(-2). This work offers useful information for designing a stable and efficient electrocatalyst for not only UOR but also electrochemical generation of H-2 from wastewater.

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标题: Modeling the competitive diffusions of rumor and knowledge and the impacts on epidemic spreading

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来源出版物: APPLIED MATHEMATICS AND COMPUTATION 卷: 388 文献号: 125536 DOI: 10.1016/j.amc.2020.125536 出版年: JAN 1 2021

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摘要: The interaction between epidemic spreading and information diffusion is an interdisciplinary research problem. During an epidemic, people tend to take self-protective measures to reduce the infection risk. However, with the diffusion of rumor, people may be difficult to make an appropriate choice. How to reduce the negative impact of rumor and to control epidemic has become a critical issue in the social network. Elaborate mathematical model is instructive to understand such complex dynamics. In this paper, we develop a two-layer network to model the interaction between the spread of epidemic and the competitive diffusions of information. The results show that knowledge diffusion can eradicate both rumor and epidemic, where the penetration intensity of knowledge into rumor plays a vital role. Specifically, the penetration intensity of knowledge significantly increases the thresholds for rumor and epidemic to break out, even when the self-protective measure is not perfectly effective. But eradicating rumor shouldn't be equated with eradicating epidemic. The epidemic can be eradicated with rumor still diffusing, and the epidemic may keep spreading with rumor being eradicated. Moreover, the communication-layer network structure greatly affects the spread of epidemic in the contact-layer network. When people have more connections in the communication-layer network, the knowledge is more likely to diffuse widely, and the rumor and epidemic can be eradicated more efficiently. When the communication-layer network is sparse, a larger penetration intensity of knowledge into rumor is required to promote the diffusion of knowledge. (C) 2020 Elsevier Inc. All rights reserved.

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第 262 条，共 300 条

标题: Nanostructured Metal Sulfides: Classification, Modification Strategy, and Solar-Driven CO2 Reduction Application

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摘要: Solar-driven conversion of CO2 into high value-added fuels is expected to be an environmental-friendly and sustainable approach for relieving the greenhouse gas effect and countering energy crisis. Metal sulfide semiconductors with wide photoresponsive range and favorable band structures are suitable photocatalysts for CO2 photoreduction. This review summarizes the recent progress on metal sulfide semiconductors for photocatalytic CO2 reduction. First, the fundamentals, mechanisms and some principles, like product selectivity, of photocatalytic CO2 reduction are introduced. Then, according to the elemental composition, the metal sulfide photocatalysts applied for CO2 reduction are classified into binary (CdS, ZnS, MoS2, SnS2, Bi2S3, In2S3,Cu2S, NiS/NiS2, and CoS2), ternary (ZnIn2S4, CdIn2S4, CuInS2, Cu3SnS4, and CuGaS2), and quaternary (Cu2ZnSnS4) systems, in which their crystal structures, photochemical characteristics, and photocatalytic CO2 reduction applications are systematically demonstrated. Especially, the diverse modification strategies for improving the activity and product selectivity of photocatalytic CO2 reduction on these metal sulfides are summarized. Finally, the current challenges and future directions for the development of metal sulfide photocatalysts for CO2 reduction are proposed. This review is expected to serve as a powerful reference for exploiting high-efficiency metal sulfide photocatalysts for CO2 conversion and furthering related mechanism understanding.

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标题: Nucleic Acids Analysis

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摘要: Nucleic acids are natural biopolymers of nucleotides that store, encode, transmit and express genetic information, which play central roles in diverse cellular events and diseases in living things. The analysis of nucleic acids and nucleic acids-based analysis have been widely applied in biological studies, clinical diagnosis, environmental analysis, food safety and forensic analysis. During the past decades, the field of nucleic acids analysis has been rapidly advancing with many technological breakthroughs. In this review, we focus on the methods developed for analyzing nucleic acids, nucleic acids-based analysis, device for nucleic acids analysis, and applications of nucleic acids analysis. The representative strategies for the development of new nucleic acids analysis in this field are summarized, and key advantages and possible limitations are discussed. Finally, a brief perspective on existing challenges and further research development is provided.

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标题: Revised chronology of central Tibet uplift (Lunpola Basin)

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摘要: Knowledge of the topographic evolution of the Tibetan Plateau is essential for understanding its construction and its influences on climate, environment, and biodiversity. Previous elevations estimated from stable isotope records from the Lunpola Basin in central Tibet, which indicate a high plateau since at least 35 Ma, are challenged by recent discoveries of low-elevation tropical fossils apparently deposited at 25.5 Ma. Here, we use magnetostratigraphic and radiochronologic dating to revise the chronology of elevation estimates from the Lunpola Basin. The updated ages reconcile previous results and indicate that the elevations of central Tibet were generally low (<2.3 km) at 39.5 Ma and high (3.5 to 4.5 km) at similar to 26 Ma. This supports the existence in the Eocene of low-elevation longitudinally oriented narrow regions until their uplift in the early Miocene, with potential implications for the growth mechanisms of the Tibetan Plateau, Asian atmospheric circulation, surface processes, and biotic evolution.

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第 265 条，共 300 条

标题: The prevalence and risk factors of psychological disturbances of frontline medical staff in china under the COVID-19 epidemic: Workload should be concerned

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来源出版物: JOURNAL OF AFFECTIVE DISORDERS 卷: 277 页: 510-514 DOI: 10.1016/j.jad.2020.08.059 出版年: DEC 1 2020

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被引频次合计: 106

摘要: Background: To our best knowledge, this was the first time to investigate the prevalence and risk factors of psychological disturbances, including depression, anxiety, somatization symptoms, insomnia and suicide, among frontline medical staff, who were working with the COVID-10 infected patients directly.

Methods: Patient Health Questionnaire Depression (PHQ-9), Generalized Anxiety Disorder Questionnaire scale (GAD-7), Symptom Check List-90 (SCL-90) somatization, Insomnia Severity Index (ISI), and the suicidal module of the Mini International Neuropsychiatric Interview were used for online survey.

Results: A total of 606 frontline hospital staff and1099 general population were recruited. The prevalence of depression, anxiety, somatization symptoms, insomnia, and suicide risk in frontline medical staffs were 57.6%, 45.4%, 12.0%, 32.0% and 13.0%, respectively. Except for suicide risk, the prevalence of other psychological disorders in frontline medical staff were higher than those in general population (all p<0.01). Among the frontline medical staff, the daily working hours were associated with all psychological disturbance (allp<0.01), women with anxiety (p = 0.02), body mass index (BMI) with anxiety and insomnia (p = 0.02, p = 0.03). Age was negatively associated with depression, anxiety, and insomnia (all p<0.01). Finally, years of working and family income were negatively associated with suicide risk (p = 0.03, p<0.001).

Conclusion: Our study demonstrates that during the outbreak of COVID-19, the frontline medical staff are more likely to suffer from psychological disturbances than general population. It is noticeable that daily working hours are a risk factor for all measured psychological disturbances, and some other variables may be involved in certain psychological disturbances of frontline medical staff.

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标题: WHU-Hi: UAV-borne hyperspectral with high spatial resolution (H-2) benchmark datasets and classifier for precise crop identification based on deep convolutional neural network with CRF

作者: Zhong, YF (Zhong, Yanfei); Hu, X (Hu, Xin); Luo, C (Luo, Chang); Wang, XY (Wang, Xinyu); Zhao, J (Zhao, Ji); Zhang, LP (Zhang, Liangpei)

来源出版物: REMOTE SENSING OF ENVIRONMENT 卷: 250 文献号: 112012 DOI: 10.1016/j.rse.2020.112012 出版年: DEC 1 2020

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摘要: Unmanned aerial vehicle (UAV)-borne hyperspectral systems can acquire hyperspectral imagery with a high spatial resolution (which we refer to here as H2 imagery). As a result of the low operating cost, high flexibility, and the ability to achieve real-time data acquisition, UAV-borne hyperspectral systems have become an im-portant data source for remote sensing based agricultural monitoring. However, precise crop classification based on UAV-borne H2 imagery is a challenging task when faced with a number of different crop classes. The traditional hyperspectral classification methods, such as the spectral-based and object-oriented classification methods, have difficulty in classifying H2 imagery, faced with the problems of salt-and-pepper (SP) noise and scale selection. In this article, the deep convolutional neural network with a conditional random field classifier (CNNCRF) framework is proposed for precise crop classification with UAV-borne H2 imagery. In the proposed method, a deep convolutional neural network (CNN) is designed to extract and fuse in-depth spectral and local spatial features, and the conditional random field (CRF) model further incorporates the spatial-contextual information to improve the problem of holes and isolated regions in the classification map. Meanwhile, virtual sample augmentation based on the hyperspectral imaging mechanism is used to lessen the issue of the limited labeled samples. To validate the results, a new dataset-the Wuhan UAV-borne hyperspectral image (WHU-Hi) dataset-has been built for precise crop classification. The experimental results obtained using the WHU-Hi dataset confirm the accuracy and visualization performance of the proposed CNNCRF classification method, which outperforms the previous methods. In addition, the WHU-Hi dataset could serve as a benchmark dataset for hyperspectral image classification studies.

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标题: Record-Breaking Meiyu Rainfall Around the Yangtze River in 2020 Regulated by the Subseasonal Phase Transition of the North Atlantic Oscillation

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来源出版物: GEOPHYSICAL RESEARCH LETTERS 卷: 47 期: 22 文献号: e2020GL090342 DOI: 10.1029/2020GL090342 出版年: NOV 28 2020

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摘要: In 2020, the Yangtze River (YR) suffered a long-persisting Meiyu season. The accumulated rainfall broke its record since 1961 and caused severe flooding and death in China. Our results show the sequential warm and cold Meiyu front regulated by the North Atlantic Oscillation (NAO) was responsible for this unexpected extreme Meiyu event. From 11 to 25 June with the positive NAO, the interaction between the South Asian High (SAH) and the western Pacific subtropical high maintained a warm front to strengthen the rainband north of the YR. Afterward, the coupling between SAH and midlatitude Mongolian Cyclone induced a cold front, which retreated the rainband to the south of YR from 30 June to 13 July with the negative NAO. Although the ECMWF S2S model successfully predicted the warm-front-related Meiyu rainband, it failed to forecast the Meiyu rainband in the cold-front period, suggesting a great challenge of S2S forecasting on Meiyu rainfall.

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标题: Photocatalytic Oxygen Evolution from Water Splitting

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摘要: Photocatalytic water splitting has attracted a lot of attention in recent years, and O-2 evolution is the decisive step owing to the complex four-electrons reaction process. Though many studies have been conducted, it is necessary to systematically summarize and introduce the research on photocatalytic O-2 evolution, and thus a systematic review is needed. First, the corresponding principles about O-2 evolution and some urgently encountered issues based on the fundamentals of photocatalytic water splitting are introduced. Then, several types of classical water oxidation photocatalysts, including TiO2, BiVO4, WO3, alpha-Fe2O3, and some newly developed ones, such as Sillen-Aurivillius perovskites, porphyrins, metal-organic frameworks, etc., are highlighted in detail, in terms of their crystal structures, synthetic approaches, and morphologies. Third, diverse strategies for O-2 evolution activity improvement via enhancing photoabsorption and charge separation are presented, including the cocatalysts loading, heterojunction construction, doping and vacancy formation, and other strategies. Finally, the key challenges and future prospects with regard to photocatalytic O-2 evolution are proposed. The purpose of this review is to provide a timely summary and guideline for the future research works for O-2 evolution.

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标题: Recognition of typical antibiotic residues in environmental media related to groundwater in China (2009-2019)

作者: Huang, FY (Huang, Fuyang); An, ZY (An, Ziyi); Moran, MJ (Moran, Michael J.); Liu, F (Liu, Fei)

来源出版物: JOURNAL OF HAZARDOUS MATERIALS 卷: 399 文献号: 122813 DOI: 10.1016/j.jhazmat.2020.122813 出版年: NOV 15 2020

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摘要: The potential adverse environmental and health-related impacts of antibiotics are becoming more and more concerning. China is globally the largest antibiotic producer and consumer, possibly resulting in the ubiquity and high detection levels of antibiotics in environmental compartments. Clear status on the concentration levels and spatial distribution of antibiotic contamination in China's environment is necessary to gain insight into the establishment of legal and regulatory frameworks. This study collects information from over 170 papers reporting the occurrence and distribution of antibiotics in China's environment. A total of 110 antibiotics were detected, and 28 priority antibiotics were ubiquitous in China in almost all compartments of the environment, excluding the atmosphere. Seven dominant antibiotics in all environment compartments were identified by cluster analysis, including tetracycline, oxytetracycline, chlortetracycline, ofloxacin, enrofloxacin, norfloxacin, and ciprofloxacin. Meanwhile, sulfamethoxazole, sulfadiazine, and sulfamethazine were also frequently found in aqueous phases. Among the main basins where antibiotics were detected, the Haihe River Basin had higher median antibiotic concentrations in surface water compared to other basins, while the Huaihe River Basin had higher median concentrations in sediment. The median values of antibiotic concentrations in the sources were as follows: animal manure, 39 mu g/kg (microgram per kilogram); WWTP (wastewater treatment plant) sludge, 39 mu g/kg; animal wastewater, 156 ng/L (nanogram per liter); WWTP effluent 15 ng/L. These concentrations are 1 - 2 orders of magnitude higher than that of the receptors (soil, 2.1 mu g/kg; sediment, 4.7 mu g/kg; surface water, 8.1 ng/L; groundwater, 2.9 ng/L), whether in solid or aqueous phases. Based on the number of detected antibiotics in various environmental compartments, animal farms and WWTPs are the main sources of antibiotics, and surface water and sediment are the main receptors of antibiotics. Hierarchical clustering identified the two main pathways of antibiotic transfer in various environmental compartments, which are from animal wastewater/WWTP effluent to surface water/sediment and from animal manure/WWTP sludge to soil/groundwater.

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第 270 条，共 300 条

标题: Do socioeconomic factors determine household multidimensional energy poverty? Empirical evidence from South Asia

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来源出版物: ENERGY POLICY 卷: 146 文献号: 111754 DOI: 10.1016/j.enpol.2020.111754 出版年: NOV 2020

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摘要: This paper examines the socioeconomic factors of energy poverty at the household level using a dataset of 674,834 households from six South Asian countries. An adjusted multidimensional energy poverty index (MEPI) is used to measure the extent and depth of energy poverty, and a Tobit model is employed to examine the significance of socioeconomic status for multidimensional energy poverty. An ordinary least squares (OLS) regression model is compared with the results of the Tobit model, using the combined dataset and the datasets for each country separately. House size, household wealth, education, occupation (clerical, sales, or agricultural), and gender of the head of the households are significant negative socioeconomic determinants of household multidimensional energy poverty. Place of residence, house ownership status, family size, and the age of the primary breadwinner play a significant positive role in multidimensional energy poverty. These results suggest that effective policy measures for improving the socioeconomic status of households will mitigate multidimensional energy poverty. With implications for the design and implementation of policy, the evidence-based results of this study will contribute to reducing the detrimental impacts of multidimensional energy poverty nationally, regionally, and globally.

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标题: Multi-View Multi-Label Learning With Sparse Feature Selection for Image Annotation

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来源出版物: IEEE TRANSACTIONS ON MULTIMEDIA 卷: 22 期: 11 页: 2844-2857 DOI: 10.1109/TMM.2020.2966887 出版年: NOV 2020

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摘要: In image analysis, image samples are always represented by multiple view features and associated with multiple class labels for better interpretation. However, multiple view data may include noisy, irrelevant and redundant features, while multiple class labels can be noisy and incomplete. Due to the special data characteristic, it is hard to perform feature selection on multi-view multi-label data. To address these challenges, in this paper, we propose a novel multi-view multi-label sparse feature selection (MSFS) method, which exploits both view relations and label correlations to select discriminative features for further learning. Specifically, the multi-labeled information is decomposed into a reduced latent label representation to capture higher level concepts and correlations among multiple labels. Multiple local geometric structures are constructed to exploit visual similarities and relations for different views. By taking full advantage of the latent label representation and multiple local geometric structures, the sparse regression model with an l2,1-norm and an Frobenius norm (F-norm) penalty terms is utilized to perform hierarchical feature selection, where the F-norm penalty performs high-level (i.e., view-wise) feature selection to preserve the informative views and the l2,1-norm penalty conducts low-level (i.e., rowwise) feature selection to remove noisy features. To solve the proposed formulation, we also devise a simple yet efficient iterative algorithm. Experiments and comparisons on real-world image datasets demonstrate the effectiveness and potential of MSFS.

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第 272 条，共 300 条

标题: Identification of Halogen-Associated Active Sites on Bismuth-Based Perovskite Quantum Dots for Efficient and Selective CO2-to-CO Photoreduction

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来源出版物: ACS NANO 卷: 14 期: 10 页: 13103-13114 DOI: 10.1021/acsnano.0c04659 出版年: OCT 27 2020

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摘要: All-inorganic Pb-free bismuth (Bi) halogen per ovskite quantum dots (PQDs) with distinct structural and photoelectric properties provide plenty of room for selective photoreduction of CO2. However, the efficient conversion of CO2-to-CO with high selectivity on Bi-based PQDs driven by solar light remains unachieved, arid the precise reaction path/mechanism promoted by the surface halogen; associatedactive sites is still poorly understood. Herein, we screen a series of nontoxic arid stable Cs3Bi2X9 = Cl, Br, I) PQDs for selective photocatalytic reduction of CO2-to-CO at the gas-solid interface. Among all the reported pure-phase PQDs, the as synthesized Cs3Bi2Br9 PQDs exhibited the highest CO2-to-CO conversion efficiency generating 134.76 mu mol g(-1) of CO yield with 98.7% selectivity under AM 1.5G simulated solar illumination. The surface halogen-associated active sites and reaction intermediates were dynamically monitored arid precisely unraveled based Orlin situ DRIFTS investigation. In combination with the DFT calculation, it was revealed that the surface Br sites allow for optimizing the coordination lmodes of surface bound intermediate species and reducing the reaction energy of the rate-limiting step of COON intermediate formation from \*CO2-. This work presents a mechanistic insight into the halogen-involved catalytic reaction mechanism in solar fuel production.

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第 273 条，共 300 条

标题: Second group of high-pressure high-temperature lanthanide polyhydride superconductors

作者: Sun, WG (Sun, Weiguo); Kuang, XY (Kuang, Xiaoyu); Keen, HDJ (Keen, Harry D. J.); Lu, C (Lu, Cheng); Hermann, A (Hermann, Andreas)

来源出版物: PHYSICAL REVIEW B 卷: 102 期: 14 文献号: 144524 DOI: 10.1103/PhysRevB.102.144524 出版年: OCT 27 2020

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摘要: Rare-earth polyhydrides formed under pressure are promising conventional superconductors, with the critical temperature T-c in compressed LaH10 almost reaching room temperature. Here, we report a systematic computational investigation of the structural and superconducting properties of rare-earth (RE) polyhydrides formed under pressure across the whole lanthanide series. Analyses of the electronic and dynamical properties and electron-phonon coupling interaction for the most hydrogen-rich hydrides REH, (n = 8, 9, 10) that can be stabilized below 400 GPa show that enhanced T-c correlates with a high density of H s states and low number of RE f states at the Fermi level. In addition to previously predicted and measured LaH10 and CeH9, we suggest YbH10 and LuH8 as additional potential high-T, superconducters. They form a "second island" of high-T, superconductivity amongst the late lanthanide polyhydrides, with an estimated T-c of 102 K for YbH10 at 250 GPa.

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第 274 条，共 300 条

标题: Redox classification and calibration of redox thresholds in sedimentary systems

作者: Algeo, TJ (Algeo, Thomas J.); Li, C (Li, Chao)

来源出版物: GEOCHIMICA ET COSMOCHIMICA ACTA 卷: 287 特刊: SI 页: 8-26 DOI: 10.1016/j.gca.2020.01.055 出版年: OCT 15 2020

Web of Science 核心合集中的 "被引频次": 214

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摘要: Existing redox classifications and the calibrations of elemental proxies to modern environmental redox scales are in need of re-evaluation. Here, we review environmental redox classifications, commonly used elemental redox proxies, and their inter calibration, and we propose a novel approach to improve the calibration of such proxies, using datasets from the modern Black Sea, Saanich Inlet, and California Margin as examples. Our approach is based on recognition of compound covariation patterns among pairs of elemental redox proxies within a redox framework based on three key thresholds: (1) the Re4+/Re3- couple near the suboxidized/subreduced boundary of the suboxic zone, (2) the U6+/U4+ couple in the middle of the subreduced zone, and (3) the SO42-/H2S couple at the suboxic/euxinic boundary. Within this framework, it is possible to determine the relative timing of onset and the degree of enrichment of other elemental redox proxies. Our analysis demonstrates that, even though some elements exhibit limited enrichment within the suboxic zone, the bulk of authigenic enrichment of the redox-sensitive elements considered in this study occurs within the euxinic zone. One important finding of our study is that the threshold value associated with a given elemental proxy can vary considerably between depositional systems. For this reason, it is inadvisable to transfer published threshold values (i.e., from earlier paleoredox studies) to completely different formations, and redox proxies must be internally calibrated for each individual paleodepositional system under investigation. (c) 2020 Elsevier Ltd. All rights reserved.

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第 275 条，共 300 条

标题: Elemental proxies for paleosalinity analysis of ancient shales and mudrocks

作者: Wei, W (Wei, Wei); Algeo, TJ (Algeo, Thomas J.)

来源出版物: GEOCHIMICA ET COSMOCHIMICA ACTA 卷: 287 特刊: SI 页: 341-366 DOI: 10.1016/j.gca.2019.06.034 出版年: OCT 15 2020

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摘要: Salinity is a fundamental property of watermasses that is useful in paleoenvironmental and paleoecological studies, yet the theory of application of geochemical proxies to paleosalinity reconstruction is underdeveloped. Here, we explore the use of three elemental ratios for paleosalinity reconstruction: boron/gallium (B/Ga), strontium/barium (Sr/Ba), and sulfur/total organic carbon (S/TOC) ratios. We compiled a large set of modern aqueous and sedimentary chemical data representing a range of salinity facies (i.e., freshwater, brackish, marine) in order to test the relationships of these proxies to ambient watermass salinity and to determine their viability for paleosalinity analysis. Sediment data were limited to fine-grained siliciclastic units (muds/shales/mudstones) without significant carbonate content, in which the elements of interest were mainly acquired through adsorption of dissolved species, forging a connection between elemental proxy values and watermass chemistry. In modern systems, watermass salinity is correlated with these proxies, yielding r of +0.99 and +0.76 for aqueous and sediment B/Ga, +0.66 and +0.54 for aqueous and sediment Sr/Ba, and +0.98 for aqueous sulfate and +0.66 for sediment S/TOC (all significant at p(alpha) < 0.01). These relationships establish the basis for use of these elemental ratios as paleosalinity proxies. Elemental crossplots permitted estimation of approximate salinity thresholds for each proxy: (1) B/Ga is <3 in freshwater, 3-6 in brackish, and >6 in marine facies; (2) Sr/Ba is <0.2 in freshwater, 0.2-0.5 in brackish, and >0.5 in marine facies; and (3) S/TOC is <0.1 in freshwater and >0.1 in brackish and marine facies. S/TOC did not discriminate effectively between brackish and marine facies, probably because microbial sulfate reduction (MSR) is generally C-org-limited rather than sulfate-limited in both facies. The accuracies of these thresholds for prediction of the salinity facies of sediments are similar to 88% for B/Ga, similar to 66% for Sr/Ba, and similar to 91% for S/TOC. Although the Sr/Ba proxy is slightly less robust owing to difficulty in removing all carbonate Sr influence and/or to greater mobility of Sr and Ba in the burial environment, we strongly advocate use of multiple proxies in order to support paleosalinity interpretations. Finally, we illustrate the application of these proxies with case studies of (1) the Ordos Basin in North China, which contains Ordovician marine shales and Triassic terrestrial mudstones, and (2) the mid-Eocene Bohai Bay Basin in NE China, which accumulated brackish to marine mudstones. (C) 2019 Elsevier Ltd. All rights reserved.

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第 276 条，共 300 条

标题: Significant changes in the chemical compositions and sources of PM2.5 Wuhan since the city lockdown as COVID-19

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来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 739 文献号: 140000 DOI: 10.1016/j.scitotenv.2020.140000 出版年: OCT 15 2020

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摘要: Wuhan was the first city to adopt the lockdown measures to prevent COVID-19 spreading, which improved the air quality accordingly. This study investigated the variations in chemical compositions, source contributions, and regional transport of fine particles (PM2.5) during January 23-February 22 of 2020, compared with the same period in 2019. The average mass concentration of PM2.5 decreased from 72.9 mu g m(-3) (2019) to 45.9 mu g m(-3) (2020), by 27.0 mu g m(-3). It was predominantly contributed by the emission reduction (92.0%), retrieved from a random forest tree approach. The main chemical species of PM2.5 all decreased with the reductions ranging from 0.85 mu g m(-3) (chloride) to 9.86 mu g m(-3) (nitrate) (p < 0.01). Positive matrix factorization model indicated that the mass contributions of seven PM2.5 sources all decreased. However, their contribution percentages varied from -11.0% (industrial processes) to 8.70% (secondary inorganic aerosol). Source contributions of PM2.5 transported from potential geographical regions showed reductions with mean values ranging from 0.22 to 436 mu g m(-3). However, increased contributions of firework burning, secondary inorganic aerosol, road dust, and vehicle emissions from transboundary transport were observed. This study highlighted the complex and nonlinear response of chemical compositions and sources of PM2.5 to air pollution control measures, suggesting the importance of regional-joint control. (C) 2020 Elsevier B.V. All rights reserved.

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标题: Analyzing government role in rural tourism development: An empirical investigation from China

作者: Liu, CY (Liu, Chunyan); Dou, XT (Dou, Xueting); Li, JF (Li, Jiangfeng); Cai, LPA (Cai, Liping A.)

来源出版物: JOURNAL OF RURAL STUDIES 卷: 79 页: 177-188 DOI: 10.1016/j.jrurstud.2020.08.046 出版年: OCT 2020

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摘要: Rural tourism in China is flourishing, largely credited by the scholars in China to the national government's stimulating policies and emphasis on rural regeneration. Against this backdrop and given the scarce literature on the government as a critical stakeholder in rural tourism, this study examines the roles of Chinese central- and local-level governments in rural tourism development. We analyzed both secondary data sourced from government documents and primary data collected through interviews with local government employees and residents at a rural destination in China. The results indicate that the central government plays a steering role in guiding rural tourism towards desired directions, and the local government plays a serving role by directly managing tourism practices and coordinating with businesses and residents to provide services and solve problems. The synergistic interaction of the central and local governments in China stimulates the rapid development of rural tourism.

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第 278 条，共 300 条

标题: Prediction of epidemic trends in COVID-19 with logistic model and machine learning technics

作者: Wang, PP (Wang, Peipei); Zheng, XQ (Zheng, Xinqi); Li, JY (Li, Jiayang); Zhu, BR (Zhu, Bangren)

来源出版物: CHAOS SOLITONS & FRACTALS 卷: 139 文献号: 110058 DOI: 10.1016/j.chaos.2020.110058 出版年: OCT 2020

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摘要: COVID-19 has now had a huge impact in the world, and more than 8 million people in more than 100 countries are infected. To contain its spread, a number of countries published control measures. However, it's not known when the epidemic will end in global and various countries. Predicting the trend of COVID-19 is an extremely important challenge. We integrate the most updated COVID-19 epidemiological data before June 16, 2020 into the Logistic model to fit the cap of epidemic trend, and then feed the cap value into FbProphet model, a machine learning based time series prediction model to derive the epidemic curve and predict the trend of the epidemic. Three significant points are summarized from our modeling results for global, Brazil, Russia, India, Peru and Indonesia. Under mathematical estimation, the global outbreak will peak in late October, with an estimated 14.12 million people infected cumulatively. (C) 2020 Elsevier Ltd. All rights reserved.

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第 279 条，共 300 条

标题: Mineralogy and element geochemistry of salinized lacustrine organic-rich shale in the Middle Permian Santanghu Basin: Implications for paleoenvironment, provenance, tectonic setting and shale oil potential

作者: Liu, B (Liu, Bo); Song, Y (Song, Yu); Zhu, K (Zhu, Kai); Su, P (Su, Peng); Ye, X (Ye, Xiang); Zhao, WC (Zhao, Wanchun)

来源出版物: MARINE AND PETROLEUM GEOLOGY 卷: 120 文献号: 104569 DOI: 10.1016/j.marpetgeo.2020.104569 出版年: OCT 2020

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摘要: The Middle Permian Lucaogou Formation in the Santanghu Basin (northwest China) develops one of the thickest salinized lacustrine organic-rich shale (SLOPS) in the world. The SLOPS has been proven as sources for crude oil and tight oil, as well as sources and reservoirs for shale oil in the basin. A total of 52 SLOPS samples were collected from the second member of Lucaogou Formation (P(2)l(2)), and analyzed by mineralogy and element geochemistry, in order to reveal the paleoenvironment, provenance, tectonic setting and shale oil potential. The results imply an evolution of paleoenvironment from anoxic, saline to dysoxic-oxic, freshwater lake, which is caused by an increased freshwater influx. Early in the P(2)l(2), volcanic ash and hydrothermal fluids have increased the nutrient level in the lake and therefore elevated the bioproductivity. The P(2)l(2) SLORS is originated from intermediate volcanic rocks, accompanied by minor proportions of basic volcanic rocks. The parent rocks of P(2)l(2) SLORS have experienced weak degree of chemical weathering, and probably derived from a continental island arc setting. Micro-, nano-pores (inter-grain pores, inter-crystalline pores, dissolution pores and organic matter pores) and microfractures are widely observed in the P(2)l(2) SLORS, which provides sufficient storage space for hydrocarbons. The P(2)l(2) SLORS is dominated by carbonate minerals, quartz and feldspar, which are all brittle minerals and favourable for artificial fracturing. Comprehensive study indicates that the upper P(2)l(2) SLORS hosts a better shale oil potential, due to the relatively high TOC, abundant micropores and microfractures, and high brittle mineral contents. In addition, individual element geochemical parameters in the Santanghu Basin should be used with caution, for example, the paleoredox proxy U/Th and paleosalinity proxy Sr/Ba are also influenced by volcanic and hydrothermal activity. This implies that a multi-proxy analysis should be applied during the study of paleoenvironmental conditions.

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标题: A comparative study of heterogeneous ensemble-learning techniques for landslide susceptibility mapping

作者: Fang, ZC (Fang, Zhice); Wang, Y (Wang, Yi); Peng, L (Peng, Ling); Hong, HY (Hong, Haoyuan)

来源出版物: INTERNATIONAL JOURNAL OF GEOGRAPHICAL INFORMATION SCIENCE 卷: 35 期: 2 页: 321-347 DOI: 10.1080/13658816.2020.1808897 提前访问日期: SEP 2020 出版年: FEB 1 2021

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摘要: This study introduces four heterogeneous ensemble-learning techniques, that is, stacking, blending, simple averaging, and weighted averaging, to predict landslide susceptibility in Yanshan County, China. These techniques combine several state-of-the-art classifiers of convolutional neural network, recurrent neural network, support vector machine, and logistic regression in specific ways to produce reliable results and avoid problems with the model selection. The study consists of three main steps. The first step establishes a spatial database consisting of 16 landslide conditioning factors and 380 historical landslide locations. The second step randomly selects training (70% of the total) and test (30%) datasets out of grid cells corresponding to landslide and non-slide locations in the study area. The final step constructs the proposed heterogeneous ensemble-learning methods for landslide susceptibility mapping. The proposed ensemble-learning methods show higher prediction accuracy than the individual classifiers mentioned above based on statistical measures. The blending ensemble-learning method achieves the highest overall accuracy of 80.70% compared to the other ensemble-learning methods.

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第 281 条，共 300 条

标题: Piezocatalysis and Piezo-Photocatalysis: Catalysts Classification and Modification Strategy, Reaction Mechanism, and Practical Application

作者: Tu, SC (Tu, Shuchen); Guo, YX (Guo, Yuxi); Zhang, YH (Zhang, Yihe); Hu, C (Hu, Cheng); Zhang, TR (Zhang, Tierui); Ma, TOY (Ma, Tionyi); Huang, HW (Huang, Hongwei)

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摘要: Piezoelectric-based catalysis that relies on the charge energy or separation efficiency of charge carriers has attracted significant attention. The piezo-potential induced by strain or stress can induce a giant electric field, which has been demonstrated to be an effective means for charge energy shifting or transferring electrons and holes. In recent years, intense efforts have been made in this subject, and the research has mainly focussed on two aspects: i) Alteration of surface charge energy by piezo-potential in piezocatalysis; ii) the separation of photo-generated charge carriers and the catalytic activity enhancement of an integrated piezoelectric semiconductor or coupled system composed of piezoelectrics and semiconductors. Systematically summarizing the advances of the above two aspects is helpful in the context of deepening understanding of the relevant issues and developing new ideas for piezoelectric-based catalysis. In this review, a comprehensive summary on piezocatalysis and piezo-photocatalysis is provided. The charge transfer behaviors and catalytic mechanisms over a large variety of piezocatalysts and piezo-photocatalysts are systematically analyzed. In addition, the types of mechanical energy, strategies for enhancing piezocatalysis, and the advanced applications of piezocatalysis and piezo-photocatalysis are discussed. Finally, the promising development directions of piezocatalysis and piezo-photocatalysis, such as materials, assembly forms, and applications in the future are proposed.

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第 282 条，共 300 条

标题: The magnificent seven: A proposal for modest revision of the Van der Voo (1990) quality index

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摘要: Thirty years ago, Rob Van der Voo proposed an elegant and simple system for evaluating the quality of paleomagnetic data. As a second-year Ph.D. student, the lead author remembers Rob waxing philosophical about the need to have an appropriate, but not overly rigid evaluation system. The end result was a 7-point system that assigned a (1) or (0) for any paleomagnetic result based on objective criteria. The goal was never to reject or blindly accept any particular result, but merely to indicate the degree of quality for any paleomagnetic pole. At the time, the global paleomagnetic database was burgeoning and it was deemed useful to rank older paleo magnetic results with the newer data being developed in modern laboratories. Van der Voo's, 1990 paper launched a silent revolution in paleomagnetism. Researchers began to evaluate their data against those seven criteria with the anticipation that reviewers would be similarly critical.

Today, paleomagnetism is a mature science. Our methods, analyses, and results are more sophisticated than they were 30 years ago. Therefore, we feel it is appropriate to revisit the Van der Voo (1990) criteria in light of those developments. We hope to honor the intention of the original paper by keeping the criteria simple and easy to evaluate while also acknowledging the advances in science. This paper aims to update the criteria and modernize the process. We base our changes on advances in paleomagnetism and geochronology with a faithful adherence to the simplicity of the original publication. We offer the "Reliability" or "R" index as the next generation of the Van der Voo "Quality" or "Q" index. The new R-criteria evaluate seven different information items for each paleomagnetic pole including age, statistical requirements, identification of magnetic carriers, field tests, structural integrity, presence of reversals and an evaluation for possible remagnetization.

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标题: An integrated mineral system model for the gold deposits of the giant Jiaodong province, eastern China

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摘要: The giant Jiaodong gold province, with more than 5000 t of proven gold resources, is unique in that its Mesozoic gold deposits are hosted in a Precambrian basement block. There has long been debate on the source of gold, the mechanism for its extreme enrichment, and a holistic genetic model for these spectacular deposits. In order to improve understanding of these factors, a mineral-system model is proposed for the Jiaodong gold deposits for the first time. It is based on a detailed review of the architecture and composition of the underlying mantle lithosphere, the geodynamic setting at the time of gold mineralization, the geological and geochemical features of the deposits themselves, and mechanisms of their preservation.

Regional geodynamic reconstructions, combined with the nature of Mesozoic magmatic systems show that Late Mesozoic breakoff of the subduction slab and rollback of the paleo-Pacific Plate caused asthenosphere upwelling and lithosphere extension and thinning. Robust geochronological studies demonstrate that the Jiaodong gold deposits formed at ca. 120 Ma during a change of subduction direction of the paleo-Pacific Plate and the synchronous transition of tectonic regime from regional compression to transpression or transtension prior to peak extension caused by thinning of the lithosphere. Geophysical exploration data and Hf-Nd isotope mapping of the Jiaodong Peninsula reveal a relatively simple ancient crustal structure cut by near-vertical shear or fault zones, including the lithosphere-scale Tan-Lu and Wulian-Yantai Faults, that provided the first-order architecture for emplacement of mantle magmas and sub-crustal fluids. In terms of fertility, the significant older pre-mineralization crustal metamorphism, combined with sulfur, lead and strontium isotope ratios, indicate a dominant sub-crustal source for the ore components for the Jiaodong gold deposits, consistent with evidence for volatile- and gold-fertilized metasomatized mantle lithosphere beneath the North China Block. Helium-Ar and C-O isotope ratios implicate mantle sources of ore fluids with contamination by crustal components en-route to crustal depositional sites. In terms of crustal architecture, combined geophysical, structural, mineralogical, fluid inclusion, and geochemical studies show that the deeply-sourced ore-fluids and metals advected upwards through lithosphere-scale faults to deposit gold via sulfidation and phase separation in crustal-scale NNE-NE-trending fault systems at mid- to upper-crustal levels. Preservation of disseminated- to stockwork-style deposits and auriferous quartz-pyrite vein deposits was enhanced by deep crustal formation combined with limited uplift and exhumation of the province.

The Jiaodong gold deposits, although commonly hosted in granite intrusions, clearly post-date them on the basis of robust and reliable geochronology. The spatial but non-temporal relationships of gold deposits with granites, their strong structural control, and their other characteristics clearly place them in the orogenic gold group. It is suggested, because of their uniqueness, that they be termed 'Jiaodong-type' orogenic gold deposits.

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标题: Efficient structure from motion for large-scale UAV images: A review and a comparison of SfM tools

作者: Jiang, S (Jiang, San); Jiang, C (Jiang, Cheng); Jiang, WS (Jiang, Wanshou)

来源出版物: ISPRS JOURNAL OF PHOTOGRAMMETRY AND REMOTE SENSING 卷: 167 页: 230-251 DOI: 10.1016/j.isprsjprs.2020.04.016 出版年: SEP 2020

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摘要: Unmanned aerial vehicle (UAV) images have gained extensive attention in varying fields, and the Structure from Motion (SfM) technique has become the gold standard for aerial triangulation of UAV images. With increasing data volume caused by the use of multi-view and high-resolution imaging systems and the enhancement of UAV platform's endurance, the capability for orientation of large-scale UAV images is becoming a prominent and necessary feature for SfM-based solutions. A classical SfM pipeline consists of three major steps, i.e., (i) feature extraction for an individual image, (ii) feature matching for each image pair, and (iii) parameter solving based on iterative bundle adjustment. Most of the time costs are consumed in the second and third steps. This can be explained from three main aspects. First, for feature matching the large number of images and high overlapping degrees cause high combinational complexity of match pairs. Second, the efficiency of commonly utilized techniques for outlier removal would be seriously degenerated because of high outlier ratios of initial matches. Third, for parameter solving of camera poses and scene structures, the iterative execution of bundle adjustment (BA) leads to high computational costs in the incremental SfM workflow. Thus, this paper gives a systematic survey of the state-of-the-art for match pair selection from both ordered and unordered datasets, for outlier removal of initial matches dominated by outliers, and for efficiency improvement of BA, and conducts an experimental evaluation for six well-known SfM-based software packages on UAV image orientation.

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第 285 条，共 300 条

标题: Extinction and dawn of the modern world in the Carnian (Late Triassic)

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摘要: The Carnian Pluvial Episode (Late Triassic) was a time of global environmental changes and possibly substantial coeval volcanism. The extent of the biological turnover in marine and terrestrial ecosystems is not well understood. Here, we present a meta-analysis of fossil data that suggests a substantial reduction in generic and species richness and the disappearance of 33% of marine genera. This crisis triggered major radiations. In the sea, the rise of the first scleractinian reefs and rock-forming calcareous nannofossils points to substantial changes in ocean chemistry. On land, there were major diversifications and originations of conifers, insects, dinosaurs, crocodiles, lizards, turtles, and mammals. Although there is uncertainty on the precise age of some of the recorded biological changes, these observations indicate that the Carnian Pluvial Episode was linked to a major extinction event and might have been the trigger of the spectacular radiation of many key groups that dominate modern ecosystems.

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标题: Feature Selective Projection with Low-Rank Embedding and Dual Laplacian Regularization

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摘要: Feature extraction and feature selection have been regarded as two independent dimensionality reduction methods in most of the existing literature. In this paper, we propose to integrate both approaches into a unified framework and design an unsupervised linear feature selective projection (FSP) for feature extraction with low-rank embedding and dual Laplacian regularization, with the aim to exploit the intrinsic relationship among data and suppress the impact of noise. Specifically, a projection matrix with an l(2,1)-norm regularization is introduced to project original high dimensional data points into a new subspace with lower dimension, where the l(2,1)-norm regularization can endow the projection with good interpretability. We deploy a coefficient matrix with low rank constraint to reconstruct the data points and the l(2,1)-norm is imposed to regularize the data reconstruction errors in the low-dimensional subspace and make FSP robust to noise. Furthermore, a dual graph Laplacian regularization term is imposed on the low dimensional data and data reconstruction matrix for preserving the local manifold geometrical structure of data. Finally, an alternatively iterative algorithm is carefully designed for solving the proposed optimization model. Theoretical convergence and computational complexity analysis of the algorithm are also provided. Comprehensive experiments on various benchmark datasets have been carried out to evaluate the performance of the proposed FSP. As indicated, our algorithm significantly outperforms other state-of-the-art methods for feature extraction.

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标题: Assessment and sources of heavy metals in suspended particulate matter in a tropical catchment, northeast Thailand

作者: Zeng, J (Zeng, Jie); Han, GL (Han, Guilin); Yang, KH (Yang, Kunhua)

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摘要: Since the suspended particulate matter (SPM) is a vital heavy metal transporter of the river systems, assessment of heavy metals contamination in SPM is significant as the first step of the high-efficiency surface water environment management and further foundation of water resources sustainability. However, this assessment is rare in developing countries (e.g., Thailand, agriculture is the main economic pillar). Fluvial heavy metal pollution prevention strategy is urgently required in these areas for reducing human exposure to metal contamination. For this purpose, the assessment of eight selected heavy metals of 52 SPM samples in a Thailand tropical river (Mun River) was conducted. The findings suggest that the contents of heavy metals in SPM are Mn (4616.7 mg kg(-1)) > Zn (223.9 mg kg(-1)) > V (109.1 mg kg(-1)) > Cr (100.1 mg kg(-1)) > Ni (51.0 mg kg(-1)) > Cu (27.6 mg kg(-1)) > Pb (14.3 mg kg(-1)) > Cd (10.7 mg kg(-1)). A relatively large proportion of heavy metals (e.g., Mn, 89.5%; Zn, 54.2%) are transported in suspended loads in Mun River. Heavy metals accumulation assessment suggests that Cd (EF = 17.5, I-geo = 3.7) and Mn (EF = 14.3, I-geo = 2.1) are extremely enriched in SPM, while the other metals are slightly enriched or not enriched. Principal component (PC) analysis extracted three PCs. PC 1 with a high loading of Mn, Zn, Cd, Pb reflecting these metals mainly from anthropogenic emissions, PC 2 (V and Cu) is primarily characterized by the natural sources (e.g., rock weathering), while PC 3 (Cr and Ni) can be defined as the result of combined action of natural and anthropogenic inputs. Risk assessment denotes that Cd is the major toxicity of SPM with a high toxic risk index (TRICd = 9.4, 54% of the total TRI) and the V, Cr, Mn, and Cd in SPM are the major exposure health risk, particularly for children (hazard index, HI > 0.1), more focus is required for these metals. In total, this study provides powerful support for the prevention of heavy metal pollution and the sustainability of water resources in the Mun River in such a developing country (Thailand).

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标题: Secular change and the onset of plate tectonics on Earth

作者: Palin, RM (Palin, Richard M.); Santosh, M (Santosh, M.); Cao, WT (Cao, Wentao); Li, SS (Li, Shan-Shan); Hernandez-Uribe, D (Hernandez-Uribe, David); Parsons, A (Parsons, Andrew)

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摘要: The Earth as a planetary system has experienced significant change since its formation c. 4.54 Gyr ago. Some of these changes have been gradual, such as secular cooling of the mantle, and some have been abrupt, such as the rapid increase in free oxygen in the atmosphere at the Archean-Proterozoic transition. Many of these changes have directly affected tectonic processes on Earth and are manifest by temporal trends within the sedimentary, igneous, and metamorphic rock record. Indeed, the timing of global onset of mobile-lid (subduction-driven) plate tectonics on our planet remains one of the fundamental points of debate within the geosciences today, and constraining the age and cause of this transition has profound implications for understanding our own planet's long-term evolution, and that for other rocky bodies in our solar system. Interpretations based on various sources of evidence have led different authors to propose a very wide range of ages for the onset of subduction-driven tectonics, which span almost all of Earth history from the Hadean to the Neoproterozoic, with this uncertainty stemming from the varying reliability of different proxies. Here, we review evidence for paleo-subduction preserved within the geological record, with a focus on metamorphic rocks and the geodynamic information that can be derived from them. First, we describe the different types of tectonic/geodynamic regimes that may occur on Earth or any other silicate body, and then review different models for the thermal evolution of the Earth and the geodynamic conditions necessary for plate tectonics to stabilize on a rocky planet. The community's current understanding of the petrology and structure of Archean and Proterozoic oceanic and continental crust is then discussed in comparison with modern-day equivalents, including how and why they differ. We then summarize evidence for the operation of subduction through time, including petrological (metamorphic), tectonic, and geochemical/isotopic data, and the results of petrological and geodynamical modeling. The styles of metamorphism in the Archean are then examined and we discuss how the secular distribution of metamorphic rock types can inform the type of geodynamic regime that operated at any point in time. In conclusion, we argue that most independent observations from the geological record and results of lithospheric-scale geodynamic modeling support a global-scale initiation of plate tectonics no later than c. 3 Ga, just preceding the Archean-Proterozoic transition. Evidence for subduction in Early Archean terranes is likely accounted for by localized occurrences of plume-induced subduction initiation, although these did not develop into a stable, globally connected network of plate boundaries until later in Earth history. Finally, we provide a discussion of major unresolved questions related to this review's theme and provide suggested directions for future research.

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标题: A full migration BBO algorithm with enhanced population quality bounds for multimodal biomedical image registration

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摘要: Medical images acquired from different modalities give rise to many practical problems in image registration. Intensity-based registration techniques have been increasingly used in multimodal image registration; these techniques integrate different images that have shared content into a single representation, by transformation. The estimation of the optimal transformation requires the optimization of a similarity metric between the images. Recently, many optimization methods have been proposed that focus on the development of the optimization component. However, there is still room for large amounts of improvement, from both an efficiency point of view and a quality perspective. In this paper we present a new Biogeography-based Optimization (BBO) algorithm, the Biogeography-based Optimization algorithm with Elite Learning (BBO-EL), for multimodal medical image registration. First, we propose a hybrid full migration operator in which each individual has the chance to perform the migration operation and the whole population has the chance to expand the search space. In this way, the search ability of the BBO algorithm is enhanced and matches well the characteristics of multimodal medical image registration. In addition, considering that the quality of some individuals could be deteriorated as caused by the migration operation, we propose an undo operator on the deteriorated individuals. Thus, the lower bound of the whole population's quality can be maintained at a higher level. Furthermore, in the original BBO algorithm, a number of good individuals might be not involved in the migration operation, and we present an elite learning operator that is based on social comparison theory to improve the upper bound of the whole population's quality. Therefore, after improving both the lower bound and the upper bound of the whole population's quality, the accuracy and the convergence speed of the multimodal medical registration can be greatly enhanced. The BBO-EL has been tested in many experiments on benchmark datasets include six kind of different modality images, from up to eighteen different patients, which can make up 54 multimodal registration scenarios. The BBO-EL obtained 30 best performance scenarios while the state-of-the-art algorithm obtained 21 scenarios. The results demonstrated that BBO-EL outperforms the state-of-the-art algorithm in most cases for practical problems. (C) 2020 Elsevier B.V. All rights reserved.

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第 290 条，共 300 条

标题: Machine learning methods for landslide susceptibility studies: A comparative overview of algorithm performance

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摘要: Landslides are one of the catastrophic natural hazards that occur in mountainous areas, leading to loss of life, damage to properties, and economic disruption. Landslide susceptibility models prepared in a Geographic Information System (GIS) integrated environment can be key for formulating disaster prevention measures and mitigating future risk. The accuracy and precision of susceptibility models is evolving rapidly from opinion-driven models and statistical learning toward increased use of machine learning techniques. Critical reviews on opinion-driven models and statistical learning in landslide susceptibility mapping have been published, but an overview of current machine learning models for landslide susceptibility studies, including background information on their operation, implementation, and performance is currently lacking. Here, we present an overview of the most popular machine learning techniques available for landslide susceptibility studies. We find that only a handful of researchers use machine learning techniques in landslide susceptibility mapping studies. Therefore, we present the architecture of various Machine Learning (ML) algorithms in plain language, so as to be understandable to a broad range of geoscientists. Furthermore, a comprehensive study comparing the performance of various ML algorithms is absent from the current literature, making an assessment of comparative performance and predictive capabilities difficult. We therefore undertake an extensive analysis and comparison between different ML techniques using a case study from Algeria. We summarize and discuss the algorithm's accuracies, advantages and limitations using a range of evaluation criteria. We note that tree-based ensemble algorithms achieve excellent results compared to other machine learning algorithms and that the Random Forest algorithm offers robust performance for accurate landslide susceptibility mapping with only a small number of adjustments required before training the model.

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第 291 条，共 300 条

标题: Sedimentary host phases of mercury (Hg) and implications for use of Hg as a volcanic proxy

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摘要: Mercury (Hg) concentration enrichments have become a widely used proxy for volcanic inputs to sediments, especially for investigation of ancient large igneous province (LIP) eruptions. Its application for this purpose requires normalization to an element representing the dominant host phase of Hg-generally total organic carbon (TOC) for the organic fraction, but occasionally total sulfur (TS) or aluminum (Al) for the sulfide or clay fractions, respectively. Hg studies generally assume an organic matter host, but recent work has demonstrated that sulfide or clay fraction host phases are not uncommon, making it essential to determine formation-specific Hg host phases. Here, we investigate Hg concentrations and their relationships to TOC, TS, and Al in four modern marine settings (Black Sea, Japan Sea, Saanich Inlet, and Peru Margin) and six ancient marine formations (from Lower Cambrian to Lower Jurassic). Multiple regression analysis (MRA) shows that the organic fraction is the dominant host of Hg in all of the modern marine sediments examined here, as well as in many ancient marine units, although in some of the latter Hg resides primarily in the sulfide fraction (i.e., lower Cambrian and Upper Ordovician units) or partly in the clay mineral fraction (Middle Permian) of the sediment. A sulfide host phase is more likely in strongly euxinic depositional facies, as reflected in high TS concentrations (>1.0%) and TS/TOC ratios (> similar to 0.35). This study thus demonstrates the importance of determining Hg host phases in sediments prior to normalization and use of Hg as a volcanic proxy. (C) 2020 Elsevier B.V. All rights reserved.

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标题: Comparisons of heuristic, general statistical and machine learning models for landslide susceptibility prediction and mapping

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摘要: Commonly used data-driven models for landslide susceptibility prediction (LSP) can be mainly classified as heuristic, general statistical or machine learning models. This study plans to compare the prediction performance of these data-driven models on the landslide susceptibility mapping, thus further to explore the inherently features of these data-driven models. As a result, a more accurate and reliable LSP can be realized through choosing an optimal data-based model. A heuristic model represented by the analytic hierarchy process (AHP), a general statistical model represented by the general linear model (GLM) and information value (IV) model, and machine learning models represented by binary logistic regression (BLR), Multilayer Perceptron (MLP), backpropagation neural network (BPNN), support vector machine (SVM) and C5.0 decision tree (C5.0 DT) are adopted in this study. Shicheng County in China is used as the study area. In total, 369 landslides identified through field investigation are classified as training (70%) and testing datasets (30%). Next, 13 landslide conditioning factors (elevation, slope, aspect, plan curvature, profile curvature, relief amplitude, total surface radiation, population density, Normalized difference vegetation index, distance to river, topographic wetness index and rock types) are acquired from data sources of the free remote sensing images, Digital Elevation Model, field investigation and government reports. The correlations between these conditioning factors and the landslide locations are determined by frequency ratio analysis. Then, the landslide susceptibility indexes (LSIs) calculated by the eight trained models are imported into GIS software to produce landslide susceptibility maps of Shicheng County. Finally, the area under receiver operating characteristic curve (AUC), the calculated LSIs are applied to assess the LSP performance of the present eight models. The testing results show that these eight models generate reasonable LSP results as a whole, further showing that the C5.0 DT is of the highest prediction accuracy with an AUC value of 0.868, followed by the SVM (0.813), BPNN (0.803), MLP (0.792), BLR (0.784), GLM (0.779), IV (0.774) and AHP (0.773). It can be inferred that the machine learning models have higher LSP performance than general statistical and heuristic models due to its high AUC accuracy and reasonable LSIs distribution features, while general statistical model is limited by its linear analysis and heuristic model is limited by subjective weighting process.

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标题: Landslide susceptibility prediction based on a semi-supervised multiple-layer perceptron model

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来源出版物: LANDSLIDES 卷: 17 期: 12 页: 2919-2930 DOI: 10.1007/s10346-020-01473-9 提前访问日期: JUL 2020 出版年: DEC 2020

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摘要: Conventional supervised and unsupervised machine learning models used for landslide susceptibility prediction (LSP) have many drawbacks, such as an insufficient number of recorded landslide samples, and the subjective and random selection of non-landslide samples. To overcome these drawbacks, a semi-supervised multiple-layer perceptron (SSMLP) is innovatively proposed with several processes: (1) an initial landslide susceptibility map (LSM) is produced using the multiple-layer perceptron (MLP) based on the original recorded landslide samples and related environmental factors; (2) the initial LSM is respectively classified into five areas with very high, high, moderate, low and very low susceptible levels; (3) some reasonable grid units from the areas with very high susceptible level are selected as new landslide samples to expand the original landslide samples; (4) reasonable non-landslide samples are selected from the areas with very low susceptible level; and (5) the expanded landslide samples, reasonable selected non-landslide samples and related environmental factors are put into the MLP once again to predict the final LSM. The Xunwu County of Jiangxi Province in China is selected as the study area. Conventional supervised machine learning (i.e. MLP) and unsupervised machine learning (i.e. K-means clustering model) are selected for comparisons. The comparative results indicate that the SSMLP model has a considerably higher LSP performance than the MLP and K-means clustering in Xunwu County. The SSMLP model successfully addresses the drawbacks existed in the conventional machine learning for LSP.

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第 294 条，共 300 条

标题: Constructing dummy query sequences to protect location privacy and query privacy in location-based services

作者: Wu, ZD (Wu, Zongda); Li, GL (Li, Guiling); Shen, SG (Shen, Shigen); Lian, XZ (Lian, Xinze); Chen, EH (Chen, Enhong); Xu, GD (Xu, Guandong)

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摘要: Location-based services (LBS) have become an important part of people's daily life. However, while providing great convenience for mobile users, LBS result in a serious problem on personal privacy, i.e., location privacy and query privacy. However, existing privacy methods for LBS generally take into consideration only location privacy or query privacy, without considering the problem of protecting both of them simultaneously. In this paper, we propose to construct a group of dummy query sequences, to cover up the query locations and query attributes of mobile users and thus protect users' privacy in LBS. First, we present a client-based framework for user privacy protection in LBS, which requires not only no change to the existing LBS algorithm on the server-side, but also no compromise to the accuracy of a LBS query. Second, based on the framework, we introduce a privacy model to formulate the constraints that ideal dummy query sequences should satisfy: (1) the similarity of feature distribution, which measures the effectiveness of the dummy query sequences to hide a true user query sequence; and (2) the exposure degree of user privacy, which measures the effectiveness of the dummy query sequences to cover up the location privacy and query privacy of a mobile user. Finally, we present an implementation algorithm to well meet the privacy model. Besides, both theoretical analysis and experimental evaluation demonstrate the effectiveness of our proposed approach, which show that the location privacy and attribute privacy behind LBS queries can be effectively protected by the dummy queries generated by our approach.

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标题: A Learning-Based Incentive Mechanism for Federated Learning

作者: Zhan, YF (Zhan, Yufeng); Li, P (Li, Peng); Qu, ZH (Qu, Zhihao); Zeng, DZ (Zeng, Deze); Guo, S (Guo, Song)

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摘要: Internet of Things (IoT) generates large amounts of data at the network edge. Machine learning models are often built on these data, to enable the detection, classification, and prediction of the future events. Due to network bandwidth, storage, and especially privacy concerns, it is often impossible to send all the IoT data to the data center for centralized model training. To address these issues, federated learning has been proposed to let nodes use the local data to train models, which are then aggregated to synthesize a global model. Most of the existing work has focused on designing learning algorithms with provable convergence time, but other issues, such as incentive mechanism, are unexplored. Although incentive mechanisms have been extensively studied in network and computation resource allocation, yet they cannot be applied to federated learning directly due to the unique challenges of information unsharing and difficulties of contribution evaluation. In this article, we study the incentive mechanism for federated learning to motivate edge nodes to contribute model training. Specifically, a deep reinforcement learning-based (DRL) incentive mechanism has been designed to determine the optimal pricing strategy for the parameter server and the optimal training strategies for edge nodes. Finally, numerical experiments have been implemented to evaluate the efficiency of the proposed DRL-based incentive mechanism.

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标题: Facet-charge-induced coupling dependent interfacial photocharge separation: A case of BiOI/g-C3N4 p-n junction

作者: Tian, N (Tian, Na); Huang, HW (Huang, Hongwei); Wang, SB (Wang, Shuobo); Zhang, TR (Zhang, Tierui); Du, X (Du, Xin); Zhang, YH (Zhang, Yihe)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 267 文献号: 118697 DOI: 10.1016/j.apcatb.2020.118697 出版年: JUN 15 2020

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摘要: Heterojunction photocatalyst fabrication benefits the improvement of photocatalytic activity. However, the influence of different coupling facets receives less attention. Herein, two p-n junctions with different coupling facets of BiOI, denoted as B001/CN002 and B110/CN002(+), were constructed by a simple precipitation method. In B001/CN002, BiOI nanosheets parallel combined with g-C3N4 with the {001} facet of BiOI and (002) plane of g-C3N4. After being treated by CTAB, the (002) plane of g-C3N4 shows positive charge (g-C3N4+), and the BiOI nanosheets were vertically assembled onto g-C3N4+. The results of photodegradation on multiform industrial contaminants and antibiotic revealed that B001/CN002 shows much higher photoactivity than g-C 3 N. 4 , g-C3N4+, BiOI and B110/CN002(+). The substantially facilitated charge separation and transfer at the interface of B001/ CN002 promote the generation of O-1(2) and center dot O-2(-), accounting for the excellent photocatalytic activity. The study may provide a new perspective on designing heterostructured photocatalytic materials via facet-charge-induced interfacial engineering strategy.

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第 297 条，共 300 条

标题: Cooperation of oxygen vacancies and 2D ultrathin structure promoting CO2 photoreduction performance of Bi4Ti3O12

作者: Liu, LZ (Liu, Lizhen); Huang, HW (Huang, Hongwei); Chen, F (Chen, Fang); Yu, HJ (Yu, Hongjian); Tian, N (Tian, Na); Zhang, YH (Zhang, Yihe); Zhang, TR (Zhang, Tierui)

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摘要: Reduction of CO2 to solar fuels by artificial photosynthesis technology has attracted considerable attention. However, insufficient separation of charge carriers and weak CO2 adsorption hamper the photocatalytic CO2 reduction activity. Herein, we tackle these challenges by introducing oxygen vacancies (OVs) on the two-dimensional Bi4Ti3O12 ultrathin nanosheets via a combined hydrothermal and postreduction process. Selective photodeposition experiment of Pt over Bi4Ti3O12 discloses that the ultrathin structure shortens the migration distance of photo-induced electrons from bulk to the surface, benefiting the fast participation in the CO2 reduction reaction. The introduction of OVs on ultrathin Bi4Ti3O12 nanosheets leads to enormous amelioration on surface state and electronic structure, thereby resulting in enhanced CO2 adsorption, photoabsorption and charge separation efficiency. The photocatalytic experiments uncover that ultrathin Bi4Ti3O12 nanosheets with OVs reveal a largely enhanced CO2 photoreduction activity for producing CO with a rate of 11.7 mu mol g(-1) h(-1) in the gas-solid system, similar to 3.2 times higher than that of bulk Bi4Ti3O12. This work not only yields efficient ultrathin photocatalysts with OVs, but also furthers our understanding on enhancing CO2 reduction via cooperative tactics. (C) 2020 Science China Press. Published by Elsevier B.V. and Science China Press. All rights reserved.

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标题: Different sampling strategies for predicting landslide susceptibilities are deemed less consequential with deep learning

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摘要: Predictive capability of landslide susceptibilities is assumed to be varied with different sampling techniques, such as (a) the landslide scarp centroid, (b) centroid of landslide body, (c) samples of the scrap region representing the scarp polygon, and (d) samples of the landslide body representing the entire landslide body. However, new advancements in statistical and machine learning algorithms continuously being updated the landslide susceptibility paradigm. This paper explores the predictive performance power of different sampling techniques in landslide susceptibility mapping in the wake of increased usage of artificial intelligence. We used logistic regression (LR), neural network (NNET), and deep learning neural network (DNN) model for testing and validation of the models. The tests were applied to the 2018 Hokkaido Earthquake affected areas using a set of 11 predictor variables (seismic, topographic, and hydrological). We found that the prediction rates are inconsequential with the DNN model irrespective of the sampling technique (AUC: 0.904 - 0.919). Whereas, testing with LR (AUC: 0.825 - 0.785) and NNET (AUC: 0.882 - 0.858) produces larger differences in the accuracies between the four datasets. Nonetheless, the highest success rates were obtained for samples within the landslide scarp area. The analogy was then validated with a published landslide inventory from the 2015 Gorkha earthquake. We, therefore, suggest that DNN models as an appropriate technique to increase the predictive performance of landslide susceptibilities if the landslide scarp and body are not characterized properly in an inventory. (C) 2020 Elsevier B.V. All rights reserved.

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第 299 条，共 300 条

标题: Quantitative source apportionment of heavy metal(loid)s in the agricultural soils of an industrializing region and associated model uncertainty

作者: Hu, YN (Hu, Yuanan); He, KL (He, Kailing); Sun, ZH (Sun, Zehang); Chen, G (Chen, Gang); Cheng, HF (Cheng, Hefa)

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摘要: Heavy metal(loid)s are natural constituents of the Earth's crust, and apportionment of their sources in surface soils is a challenging task. This study evaluated the application of positive matrix factorization (PMF) model, assisted with regression modeling and geospatial mapping, in the quantitative source apportionment of heavy metal(loid)s in the agricultural soils of Handan, a region covering > 12,000 km(2). Obvious enrichment of As, Cd, Cu, Pb, and Zn was found in the surface soils, with Cd alone accounted for 73 % of the overall potential ecological risk. PMF model revealed that Cd (56.9 %) and Pb (47.8 %) in the region's agricultural soils were predominantly contributed by industrial sources, Fe (71.8 %), Cr (60.0 %), V (52.9 %), Cu (50.7 %), Ni (42.2 %), and Mn (41.4 %) were primarily of lithogenic origin, while Co (54.1 %), As (42.9 %), and Zn (40.0 %) mainly came from the mixed sources of natural background, agricultural sources, and vehicle emissions. Uncertainty analysis showed that the contributions of pollution sources to the soil heavy metal(loid)s estimated by PMF model had considerable variations. While quantitative source apportionment of heavy metal(loid)s in soils could be achieved with PMF based on their spatial distributions, combination with emission inventory and reactive transport are probably necessary to obtain more accurate results.

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第 300 条，共 300 条

标题: Recent Advances in Bismuth Ion-Doped Phosphor Materials: Structure Design, Tunable Photoluminescence Properties, and Application in White LEDs

作者: Dang, PP (Dang, Peipei); Liu, DJ (Liu, Dongjie); Li, GG (Li, Guogang); Al Kheraif, AA (Al Kheraif, Abdulaziz A.); Lin, J (Lin, Jun)

来源出版物: ADVANCED OPTICAL MATERIALS 卷: 8 期: 16 文献号: 1901993 DOI: 10.1002/adom.201901993 提前访问日期: JUN 2020 出版年: AUG 2020

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摘要: Bismuth ion is an excellent activator and sensitizer for luminescent materials, which has been extensively studied during the recent decades. Bi3+-doped phosphors have received considerable attention for their abundant emission colors covering the whole visible light region under ultraviolet (UV) and near ultraviolet (n-UV) excitation, in flexible crystal structures. These phosphor materials have demonstrated potential applications in solid-state lighting, display, biomedical, and optical sensing. Herein, the recent advances in the structure design and photoluminescence properties of Bi3+-doped phosphors together with their white light emitting diode (WLED) applications are reviewed. The design strategies for crystal structure and the discovery of typical phosphors are systematically summarized, and the luminescent properties of Bi3+ can be effectively regulated by these strategies. Then, the design of polychromatic Bi3+-doped phosphors produced by different doping ions is described, which in turn can adjust the emission colors and realize a single-component white-light emission. This review will promote researches on the discovery of new Bi3+-doped phosphor materials, and the design strategies could provide an extensive guidance for the discovery and preparation of high-efficient phosphors with color-tunable emission including white-emission for WLEDs in the future. Additionally, research progress of Bi3+-doped perovskite and Bi2+-doped phosphor materials is briefly elucidated.

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第 1 条，共 321 条

标题: Quantitative identification and spatial analysis of land use ecological-production-living functions in rural areas on China's southeast coast

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来源出版物: HABITAT INTERNATIONAL 卷: 100 文献号: 102182 DOI: 10.1016/j.habitatint.2020.102182 出版年: JUN 2020

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摘要: The quantitative identification of land use functions (LUFs) forms the basis of land use planning and management. Based on the widely recognized "ecological-production-living" function in sustainable development, a uniform classification and value evaluation system of LUFs for China's rural land use planning and management is established. To highlight the functions of ecological regulation, product supply and living security, the LUFs were divided into 8 primary functions and 20 subfunctions. LUF value evaluation function groups were established based on the indirect or direct value of land use. For empirical research, Fengzhou Town, a typical rural coastal area in southeastern China, was selected as an example. The results show that the values of the ecological, production and living functions account for 14.31%, 44.54% and 41.15% of the total value, respectively. This finding indicates that the primary direction of land use in the study area is oriented toward pursuing the production and living functions. The spatial distribution of the values of the production and living functions shows obvious consistency, and they are also clearly complementary with the ecological function. More than 90% of the land area is assigned double or triple functions, which indicates that the multifunctional characteristics of land use are significant, while the spatial function zoning is disordered. These findings are consistent with the socioeconomic development of the study area, demonstrating that the established classification and value evaluation system of LUFs can reliably reflect realistic land use and will provide scientific support for the multifunctional utilization and effective management of rural land in China.

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第 2 条，共 321 条

标题: Topological polaritons and photonic magic angles in twisted alpha-MoO(3)bilayers

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摘要: Twisted two-dimensional bilayer materials exhibit many exotic electronic phenomena. Manipulating the 'twist angle' between the two layers enables fine control of the electronic band structure, resulting in magic-angle flat-band superconductivity(1,2), the formation of moire excitons(3-8)and interlayer magnetism(9). However, there are limited demonstrations of such concepts for photons. Here we show how analogous principles, combined with extreme anisotropy, enable control and manipulation of the photonic dispersion of phonon polaritons in van der Waals bilayers. We experimentally observe tunable topological transitions from open (hyperbolic) to closed (elliptical) dispersion contours in bilayers of alpha-phase molybdenum trioxide (alpha-MoO3), arising when the rotation between the layers is at a photonic magic twist angle. These transitions are induced by polariton hybridization and are controlled by a topological quantity. At the transitions the bilayer dispersion flattens, exhibiting low-loss tunable polariton canalization and diffractionless propagation with a resolution of less than lambda(0)/40, where lambda(0)is the free-space wavelength. Our findings extend twistronics(10)and moire physics to nanophotonics and polaritonics, with potential applications in nanoimaging, nanoscale light propagation, energy transfer and quantum physics.

The photonic dispersion of phonon polaritons in bilayers of alpha-phase molybdenum trioxide can undergo tunable topological transitions at magic interlayer twist angles.

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第 3 条，共 321 条

标题: Integration of convolutional neural network and conventional machine learning classifiers for landslide susceptibility mapping

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摘要: Landslides are regarded as one of the most common geological hazards in a wide range of geo-environment. The aim of this study is to assess landslide susceptibility by integrating convolutional neural network (CNN) with three conventional machine learning classifiers of support vector machine (SVM), random forest (RF) and logistic regression (LR) in the case of Yongxin Country, China. To this end, 16 predisposing factors were first selected for landslide modelling. Then, a total of 364 landslide historical locations were randomly divided into training (70%; 255) and verification (30%; 109) sets for modelling process and assessment. Next, the training set was used for building three hybrid methods of CNN-SVM, CNN-RF and CNN-LR. In the following, the trained models were used for landslide susceptibility mapping. Finally, several objective measures were employed to compare and validate the performance of these methods. The experimental results demonstrated that the performance of the machine learning classifiers previously mentioned can be effectively improved by integrating the CNN technique. Therefore, the proposed hybrid methods can be recommended for landslide spatial modelling in other prone areas with similar geo-environmental conditions.

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第 4 条，共 321 条

标题: Recent advances in carbon dioxide utilization

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摘要: Carbon dioxide (CO2) is the major contributor to greenhouse gas (GHG) emissions and the main driver of climate change. Currently, CO2 utilization is increasingly attracting interest in processes like enhanced oil recovery and coal bed methane and it has the potential to be used in hydraulic fracturing processes, among others. In this review, the latest developments in CO2 capture, utilization, conversion, and sequestration are examined through a multi-scale perspective. The diverse range of CO2 utilization applications, including mineralization, biological utilization, food and beverages, energy storage media, and chemicals, is comprehensively presented. We also discuss the worldwide research and development of CO2 utilization projects. Lastly, we examine the key challenges and issues that must be faced for pilot-scale and industrial applications in the future. This study demonstrates that CO2 utilization can be a driver for the future development of carbon capture and utilization technologies. However, considering the amount of CO2 produced globally, even if it can be reduced in the near-to mid-term future, carbon capture and storage will remain the primary strategy and, so, complementary strategies are desirable. Currently, the main CO2 utilization industry is enhanced oil and gas recovery, but considering the carbon life cycle, these processes still add CO2 to the atmosphere. In order to implement other CO2 utilization technologies at a large scale, in addition to their current technical feasibility, their economic and societal viability is critical. Therefore, future efforts should be directed toward reduction of energy penalties and costs, and the introduction of policies and regulation encouraging carbon capture, utilization and storage, and increasing the public acceptance of the strategies in a complementary manner.

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第 5 条，共 321 条

标题: Biomimetic structural cellulose nanofiber aerogels with exceptional mechanical, flame-retardant and thermal-insulating properties

作者: Wang, D (Wang, Dong); Peng, HY (Peng, Hongyun); Yu, B (Yu, Bin); Zhou, KQ (Zhou, Keqing); Pan, HF (Pan, Haifeng); Zhang, LP (Zhang, Liping); Li, M (Li, Min); Liu, MM (Liu, Mingming); Tian, AL (Tian, Anli); Fu, SH (Fu, Shaohai)

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摘要: With the rapid increase of energy consumption, thermal-insulating materials made from abundant renewable resources are in urgent need for energy-efficient buildings, which satisfies the sustainable development of society. Cellulose nanofiber aerogels exhibit a promising prospect in thermal-insulating application, whereas still confront the inherent weakness of high flammability as well as the improvement of mechanical stiffness and thermal insulation. In the present study, inserting the growth of two-dimensional zirconium phosphate within multilayer graphene results in the formation of hierarchical graphene-confined zirconium phosphate (ZrP/RGO) nanosheets through a spatial confinement strategy. Inspired by the porous lamella-bridge architecture of Thalia dealbata stem, a unidirectional freeze-casing technique is utilized to assemble the building blocks of cellulose nanofiber and ZrP/RGO nanosheet into a biomimetic-structural aerogel which has excellent thermal-insulating, mechanical and flame-retardant properties. Compared with state-of-the-art cellulose nanofiber-based aerogels, the resulting composite aerogel perpendicular to lamellar alignments shows an ultralow thermal conductivity (18 mW.m(-1).K-1), the maximal specific Young's modulus (104 kN.m.kg(-1)) and high limited oxygen index (33.5) as well as very low peak heat release rate (14.1 kW/m(2)). Nature provides renewable resources and structural inspirations to achieve high-performance thermal insulation materials through nanoscale engineering.

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第 6 条，共 321 条

标题: New insights on stability of sampled-data systems with time-delay

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摘要: This paper analyses the stability of sampled-data systems with time-delay. By employing a two-sided looped-functional approach, some improved conditions are derived to guarantee the stability of the system under consideration. Then, based the conditions, some intrinsic relationships between sampled-data period and time delay are obtained. From the illustrative example being solved by the proposed approach, it is observed that the results obtained are significantly better than those obtained by existing methods. More importantly, from the simulation being carried out, it is discovered that, contrary to the findings in previous studies, time-delays in a system may enlarge the interval of sampled-data periods and accelerate the rate of convergence of the system states, rather than deteriorate the system performance. (C) 2020 Elsevier Inc. All rights reserved.

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第 7 条，共 321 条

标题: Asymmetric impact of energy consumption and economic growth on ecological footprint: Using asymmetric and nonlinear approach

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来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 718 文献号: 137364 DOI: 10.1016/j.scitotenv.2020.137364 出版年: MAY 20 2020

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摘要: The main objective of this article is to examine the impacts of energy consumption and economic growth on environmental quality in Pakistan. We use the ecological footprint (environmental quality) as a target variable, the control variables of gross domestic products are a proxy of economic growth, and energy consumption and gross fixed capital formation arc proxies of capital from 1971 to 2014. For this purpose, a unit root test with break dates is employed for a stationary check, and a BDS test is used for nonlinearity. The nonlinear autoregressive distributed lag approach is employed to assess the asymmetric co-integration among the variables. These results confirm the asymmetric co-integration among the variables. The asymmetric causality technique is also applied to scrutinize the causal link between the variables. The asymmetric feedback effect is observed between positive shocks to environmental quality and energy consumption, and symmetrically, environmental quality causes energy consumption. By contrast, the neutral effect is observed among environmental quality, economic growth, and capital. Based on these findings, current energy portfolios should be diversified by either enhancing or incorporating renewable energy technologies, and this is indispensable to support the existing successful strides of environmental policies. Thus, policymakers must buttress their commitments to reduce emissions by sustaining and decarbonizing the trajectory of economic growth. (C) 2020 Elsevier B.V. All rights reserved.

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第 8 条，共 321 条

标题: Temporal Convolutional Networks for the Advance Prediction of ENSO

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来源出版物: SCIENTIFIC REPORTS 卷: 10 期: 1 文献号: 8055 DOI: 10.1038/s41598-020-65070-5 出版年: MAY 15 2020

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摘要: El Nino-Southern Oscillation (ENSO), which is one of the main drivers of Earth's inter-annual climate variability, often causes a wide range of climate anomalies, and the advance prediction of ENSO is always an important and challenging scientific issue. Since a unified and complete ENSO theory has yet to be established, people often use related indicators, such as the Nino 3.4 index and southern oscillation index (SOI), to predict the development trends of ENSO through appropriate numerical simulation models. However, because the ENSO phenomenon is a highly complex and dynamic model and the Nino 3.4 index and SOI mix many low- and high-frequency components, the prediction accuracy of current popular numerical prediction methods is not high. Therefore, this paper proposed the ensemble empirical mode decomposition-temporal convolutional network (EEMD-TCN) hybrid approach, which decomposes the highly variable Nino 3.4 index and SOI into relatively flat subcomponents and then uses the TCN model to predict each subcomponent in advance, finally combining the sub-prediction results to obtain the final ENSO prediction results. Nino 3.4 index and SOI reanalysis data from 1871 to 1973 were used for model training, and the data for 1984-2019 were predicted 1 month, 3 months, 6 months, and 12 months in advance. The results show that the accuracy of the 1-month-lead Nino 3.4 index prediction was the highest, the 12-month-lead SOI prediction was the slowest, and the correlation coefficient between the worst SOI prediction result and the actual value reached 0.6406. Furthermore, the overall prediction accuracy on the Nino 3.4 index was better than that on the SOI, which may have occurred because the SOI contains too many high-frequency components, making prediction difficult. The results of comparative experiments with the TCN, LSTM, and EEMD-LSTM methods showed that the EEMD-TCN provides the best overall prediction of both the Nino 3.4 index and SOI in the 1-, 3-, 6-, and 12-month-lead predictions among all the methods considered. This result means that the TCN approach performs well in the advance prediction of ENSO and will be of great guiding significance in studying it.

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第 9 条，共 321 条

标题: A re-assessment of elemental proxies for paleoredox analysis

作者: Algeo, TJ (Algeo, Thomas J.); Liu, JS (Liu, Jiangsi)

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摘要: Paleoredox conditions are commonly evaluated based on elemental proxies but, despite their frequency of use, most of these proxies have received little comparative evaluation or assessment of their range of applicability to paleomarine systems. Here, we evaluate 21 elemental proxies, including six proxies based on the C-S-Fe-P system (TOC, S, TOC/S, DOPT, Fe/Al, C-org/P), nine proxies based on trace-metal enrichment factors (Co-EF, Cr-EF, Cu-EF, Mo-EF, Ni-EF, Pb-EF, U-EF, V-EF, Zn-EF), and six additional proxies from Jones and Manning (1994) (U/Th, U-auth, V/Cr, Ni/Co, Ni/V, (Cu+Mo)/Zn), in 55 Phanerozoic marine formations. We used principal components analysis (PCA) to determine relationships among these 21 proxies in each formation and then sought to identify patterns across the full database. The first principal component (PC1) accounted for 40.1% of total dataset variance on average, with the highest median loadings on trace-metal enrichment factors (Ni-EF 0.82, Mo-EF 0.76, all nine >0.50). The next highest median loadings are on C-S-Fe-P proxies (TOC 0.58, DOPT 0.30, C-org/P 0.28), with bimetal proxies yielding uniformly lower loadings (Ni/Co 0.18, V/Cr 0.13). PCA of the factor loadings for the 55 study formations demonstrated associations among the 21 elemental proxies linked to specific sediment host phases: (1) an organic cluster associated with TOC, Mo, V, and Zn, (2) a uranium cluster associated with all U-based proxies, and (3) a sulfide cluster associated with S and Fe as well as the trace metals Co, Cu, Ni, and Pb (i.e., the major and typical minor constituents of diagenetic pyrite).

The findings of the present study have important ramifications for use of elemental proxies for paleoredox analysis. First, all of the proxies examined here are influenced by environmental redox conditions to some degree, although the degree of redox influence on any given proxy can vary considerably from one formation to the next. Second, sedimentary enrichment of most proxies depends on the presence of specific mineral and organic host phases, and evaluation of elemental redox proxy data requires an understanding of how elements are partitioned among those phases. Third, no single proxy is a universally reliable redox indicator, although some are more consistently useful than others-notably, TOC and trace-metal EFs. Fourth, because of this inherent variability in proxy response, adoption of redox proxy thresholds established in earlier published studies is discouraged. Instead, we recommend that future redox studies establish redox thresholds on a formation-specific basis through internal cross-calibration of multiple redox proxies.

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第 10 条，共 321 条

标题: Critical role of water in the formation of continental crust

作者: Collins, WJ (Collins, William J.); Murphy, JB (Murphy, J. Brendan); Johnson, TE (Johnson, Tim E.); Huang, HQ (Huang, Hui-Qing)

来源出版物: NATURE GEOSCIENCE 卷: 13 期: 5 页: 331-338 DOI: 10.1038/s41561-020-0573-6 提前访问日期: MAY 2020 出版年: MAY 2020

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摘要: Continental arcs are the sites of production of continental crust, but the origin of these magmatic systems is not well understood. Although a number of processes have been suggested to be important, the role of water migrating from slab to surface during subduction has been underappreciated. Directly below the Moho, hot (approximately 1,100 degrees C), hydrous basaltic magmas fractionate as they cool to the regional geotherm at 750 to 800 degrees C, ultimately solidifying as mafic underplates. Cooling and fractionation cause water to exsolve and ascend, triggering fluid-fluxed melting of overlying mafic underplates and other crust. Melting of prior mafic underplates buffers temperatures and generates the voluminous, juvenile low-K magmas of Cordilleran batholiths. These granitoid magmas comprise a low-temperature slurry of melt and residue, and recrystallize into silicic mush during adiabatic ascent. Such hydrous mushes are intermittently infused by hotter, more mafic magmas, which hybridize and facilitate ascent and, potentially, eruption. Fluid-fluxed melting overcomes many of the general petrological and geochemical problems associated with models dominated by fractional crystallization. The role of water during repeated episodes of mafic underplating is critical to generate the juvenile granitoid infrastructure of the continents.

Migration of water from the slab to the surface during subduction is highlighted as a key process in the formation of continental crust.

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第 11 条，共 321 条

标题: Deconstructing South China and consequences for reconstructing Nuna and Rodinia

作者: Cawood, PA (Cawood, Peter A.); Wang, W (Wang, Wei); Zhao, TY (Zhao, Tianyu); Xu, YJ (Xu, Yajun); Mulder, JA (Mulder, Jacob A.); Pisarevsky, SA (Pisarevsky, Sergei A.); Zhang, LM (Zhang, Limin); Gan, CS (Gan, Chengshi); He, HY (He, Huiying); Liu, HC (Liu, Huichuan); Qi, L (Qi, Liang); Wang, YJ (Wang, Yuejun); Yao, JL (Yao, Jinlong); Zhao, GC (Zhao, Guochun); Zhou, MF (Zhou, Mei-Fu); Zi, JW (Zi, Jian-Wei)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 204 文献号: 103169 DOI: 10.1016/j.earscirev.2020.103169 出版年: MAY 2020

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摘要: Contrasting models for internal and external locations of South China within the Nuna and Rodinia supercontinents can be resolved when the current lithotectonic associations of Mesoproterozoic and older rocks units that constitute the craton are redefined into four lithotectonic domains: Kongling, Kunming-Hainan, Wuyi, and Coastal. The Kongling and Kunming-Hainan domains are characterized by isolated Archean to early Paleoproterozoic rock units and events and crop out in northern and southern South China, respectively. The Kunming-Hainan Domain is preserved in three spatially separated regions at Kunming (southwestern South China), along the Ailaoshan shear zone, and within Hainan Island. Both domains were affected by late Paleoproterozoic tectonothermal events, indicating their likely juxtaposition by this time to form the proto-Yangtze Block. Late Paleoproterozoic and Mesoproterozoic sedimentary and igneous rock units developed on the protoYangtze Block, especially in its southern portions, and help link the rock units that formed along the shear zone at Ailaoshan and on Hainan Island into a single, spatially unified unit prior to Paleozoic to Cenozoic structural disaggregation and translation. The Wuyi Domain consists of late Paleoproterozoic rock units within a NE-SW trending, fault-bounded block in eastern South China. The Coastal Domain lies east of the Wuyi domain and is inferred to constitute a structurally separate block. Basement to the domain is not exposed, but zircon Hf model ages from Mesozoic granites suggest Mesoproterozoic basement at depth.

The Archean to Paleoproterozoic tectonothermal record of the Kongling and Kunming-Hainan domains corresponds closely with that of NW Laurentia, suggesting all were linked, probably in association with assembly and subsequent partial fragmentation of the Nuna supercontinent. Furthermore, the age and character of Mesoproterozoic magmatism and detrital zircon signature of sedimentary rocks in the proto-Yangtze Block matches well with western Laurentia and eastern Australia-Antarctica. In particular, the detrital zircon signature of late Paleoproterozoic to early Mesoproterozoic sedimentary units in the block (e.g. Dongchuan Group) share a similar age spectrum with the Wernecke Supergroup of northwest Laurentia. This, together with similarities in the type and age of Fe-Cu mineralization in the domain with that in eastern Australia-Antarctica, especially northeast Australia, suggests a location adjacent to northwest Laurentia, southern Siberia, and northeast Australia within the Nuna supercontinent.

The timing and character of late Paleoproterozoic magmatic activity in the Wuyi domain along with age of detrital zircons in associated sedimentary rocks matches the record of northern India. During rifting between Australia-Antarctica and Laurentia in the late Mesoproterozoic, the proto-Yangtze Block remained linked to northeast Australia. During accretionary orogenesis in the early Neoproterozoic, the proto-Yangtze Block assembled with the Wuyi Domain along the northern margin of India. The Coastal domain likely accreted at this time forming the South China Craton. Displacement of the Hainan and Ailaoshan assemblages from southwest of the Kunming assemblage likely occurred in the Cenozoic with the activation of the Ailaoshan-Red River fault system but could have begun in the early to mid-Paleozoic based on evidence for tectonothermal events in the Hainan assemblage.

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第 12 条，共 321 条

标题: IN SITU DATING OF HYDROTHERMAL MONAZITE AND IMPLICATIONS FOR THE GEODYNAMIC CONTROLS ON ORE FORMATION IN THE JIAODONG GOLD PROVINCE, EASTERN CHINA

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摘要: The Jiaodong gold province, the largest gold producer in China, formed in a setting dominated by a 30-m.y. episode of Izanagi plate rollback and widespread extension, concomitant with late Mesozoic craton destruction. This study presents new high precision in situ sensitive high-resolution ion microprobe (SHRIMP) U-Th-Pb and laser ablation-inductively coupled plasma-mass spectrometry (LA-ICP-MS) U-Pb ages for hydrothermal monazite from the largest of the Jiaodong gold deposits, which were previously dated as indicating ore formation over a few tens of millions of years when applying sericite Ar-Ar, zircon U-Pb, and less robust analytical techniques. Our U-Pb dating on monazite from the Jiaojia and Linglong deposits in western Jiaodong yielded consistent ages at ca. 120 Ma. The new geochronologic results, coupled with recently reported in situ monazite dates from smaller deposits in western Jiaodong, reveal that the deposits that host most of the >= 4,000-t Au resource formed during a relatively brief period at ca. 120 Ma. In eastern Jiaodong, the much smaller resource may have formed about 5 m.y. later, recorded by 114.2 +/- 1.5 Ma gold mineralization at the Rushan deposit. The postsubduction opening of a slab gap at ca. 120 Ma is the most likely cause of the extensive gold mineralization in Jiaodong. The gap induced a local and rapid devolatilization of the hydrated mantle wedge at submelt temperatures. The transient event included release of a major volume of gold-transporting aqueous-carbonic fluid that was stored in the wedge into major NNE-trending structures in the overlying lithosphere.

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第 13 条，共 321 条

标题: Comparative study of landslide susceptibility mapping with different recurrent neural networks

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摘要: This paper aims to use recurrent neural networks (RNNs) to perform landslide susceptibility mapping in Yongxin County, China. The two main contributions of this study are summarized as follows. First, the regular RNN is compared to its three variants in the case study of landslide susceptibility mapping for the first time, including long short term memory, gated recurrent unit and simple recurrent unit. Second, a sequential data representation method is proposed to fully explore the predicting potential of RNNs. The study area consists of 364 historical landslide locations that were divided into two parts: 255 (70%) for training and 109 (30%) for validation, and 16 landslide influencing factors were considered for spatial prediction. To validate the effectiveness of these RNN-related methods, several objective measures of accuracy, recall, F-measure, Matthews correlation coefficient and the receiver operating characteristic were used for evaluation. Experimental results demonstrate that very high and high susceptible areas are concentrated in the northwest and south of Yongxin County, while landslides in the central area are less prone to occur. Based on quantitative results, all the RNN-related methods achieved area under the curve values above 0.83 and produced accurate prediction results with the optimized parameters. Therefore, the RNN framework can be used as a useful tool for the landslide susceptibility mapping task to mitigate and manage landslides.

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标题: Type I photosensitizers based on phosphindole oxide for photodynamic therapy: apoptosis and autophagy induced by endoplasmic reticulum stress

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摘要: Photodynamic therapy (PDT) is considered a pioneering and effective modality for cancer treatment, but it is still facing challenges of hypoxic tumors. Recently, Type I PDT, as an effective strategy to address this issue, has drawn considerable attention. Few reports are available on the capability for Type I reactive oxygen species (ROS) generation of purely organic photosensitizers (PSs). Herein, we report two new Type I PSs, alpha-TPA-PIO and beta-TPA-PIO, from phosphindole oxide-based isomers with efficient Type I ROS generation abilities. A detailed study on photophysical and photochemical mechanisms is conducted to shed light on the molecular design of PSs based on the Type I mechanism. The in vitro results demonstrate that these two PSs can selectively accumulate in a neutral lipid region, particularly in the endoplasmic reticulum (ER), of cells and efficiently induce ER-stress mediated apoptosis and autophagy in PDT. In vivo models indicate that beta-TPA-PIO successfully achieves remarkable tumor ablation. The ROS-based ER stress triggered by beta-TPA-PIO-mediated PDT has high potential as a precursor of the immunostimulatory effect for immunotherapy. This work presents a comprehensive protocol for Type I-based purely organic PSs and highlights the significance of considering the working mechanism in the design of PSs for the optimization of cancer treatment protocols.

入藏号: WOS:000526696500018

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ESI 热点论文: N

输出日期: 2023-09-04

第 15 条，共 321 条

标题: Destruction of Per- and Polyfluoroalkyl Substances (PFAS) with Advanced Reduction Processes (ARPs): A Critical Review

作者: Cui, JK (Cui, Junkui); Gao, PP (Gao, Panpan); Deng, Y (Deng, Yang)

来源出版物: ENVIRONMENTAL SCIENCE & TECHNOLOGY 卷: 54 期: 7 页: 3752-3766 DOI: 10.1021/acs.est.9b05565 出版年: APR 7 2020

Web of Science 核心合集中的 "被引频次": 152

被引频次合计: 156

摘要: Advanced reduction processes (ARPs) have emerged as a promising method for destruction of persistent per- and polyfluoroalkyl substances (PFAS) in water due to the generation of short-lived and highly reductive hydrated electrons (e(aq)(-)). This study provides a critical review on the mechanisms and performance of reductive destruction of PFAS with e(aq)(-). Unique properties of e(aq)(-) and its generation in different ARP systems, particularly UV/sulfite and UV/iodide, are overviewed. Different degradation mechanisms of PFAS chemicals, such as perfluorooctanoic acid (PFOA), perfluorooctanesulfonate (PFOS), and others (e.g., short chain perfluorocarboxylic acids (PFCAs) and perfluorosulfonic acids (PFSAs), per- and polyfluoro dicarboxylic acids, and fluorotelomer carboxylic acids), are reviewed, discussed, and compared. The degradation pathways of these PFAS chemicals rely heavily upon their head groups. For specific PFAS types, fluoroalkyl chain lengths may also affect their reductive degradation patterns. Degradation and defluorination efficiencies of PFAS are considerably influenced by solution chemistry parameters and operating factors, such as pH, dose of chemical solute (i.e., sulfite or iodide) for e(aq)(-) photoproduction, dissolved oxygen, humic acid, nitrate, and temperature. Furthermore, implications of the state-of-the-art knowledge on practical PFAS control actions in water industries are discussed and the priority research needs are identified.

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ESI 热点论文: N

输出日期: 2023-09-04

第 16 条，共 321 条

标题: Tuning Nanofillers in In Situ Prepared Polyimide Nanocomposites for High-Temperature Capacitive Energy Storage

作者: Ai, D (Ai, Ding); Li, H (Li, He); Zhou, Y (Zhou, Yao); Ren, LL (Ren, Lulu); Han, ZB (Han, Zhubing); Yao, B (Yao, Bin); Zhou, W (Zhou, Wei); Zhao, L (Zhao, Ling); Xu, JM (Xu, Jianmei); Wang, Q (Wang, Qing)

来源出版物: ADVANCED ENERGY MATERIALS 卷: 10 期: 16 文献号: 1903881 DOI: 10.1002/aenm.201903881 出版年: APR 2020

Web of Science 核心合集中的 "被引频次": 200

被引频次合计: 205

摘要: Modern electronics and electrical systems demand efficient operation of dielectric polymer-based capacitors at high electric fields and elevated temperatures. Here, polyimide (PI) dielectric composites prepared from in situ polymerization in the presence of inorganic nanofillers are reported. The systematic manipulation of the dielectric constant and bandgap of the inorganic fillers, including Al2O3, HfO2, TiO2, and boron nitride nanosheets, reveals the dominant role of the bandgap of the fillers in determining and improving the high-temperature capacitive performance of the polymer composites, which is very different from the design principle of the dielectric polymer composites operating at ambient temperature. The Al2O3- and HfO2-based PI composites with concomitantly large bandgap and moderate dielectric constants exhibit substantial improvement in the breakdown strength, discharged energy density, and charge-discharge efficiency when compared to the state-of-the-art dielectric polymers. The work provides a design paradigm for high-performance dielectric polymer nanocomposites for electrical energy storage at elevated temperatures.

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ESI 高被引论文: Y

ESI 热点论文: N

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第 17 条，共 321 条

标题: Shale pore structure characteristics of the high and low productivity wells, Jiaoshiba shale gas field, Sichuan Basin, China: Dominated by lithofacies or preservation condition?

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来源出版物: MARINE AND PETROLEUM GEOLOGY 卷: 114 文献号: 104211 DOI: 10.1016/j.marpetgeo.2019.104211 出版年: APR 2020

Web of Science 核心合集中的 "被引频次": 93

被引频次合计: 98

摘要: Both the characteristics of lithofacies and tectonic movements are important factors in controlling the development, destruction, and preservation of pores in shale reservoirs. However, the main factors that control the structure of shale pores are complex and highly disputed, restricting the understanding of the mechanisms that lead to the accumulation of shale gas. In this study, mineral composition and geochemical analyses, high resolution field emission scanning electron microscopy (FE-SEM), and low-pressure gas adsorption (N-2 and CO2) were conducted to evaluate the pore systems of different types shale in the Jiaoshiba area, Sichuan Basin. A total of three shale groups, including silica-rich high production shales, clay-rich low production shales, and silica-rich low production shales were identified on the basis of lithofacies and gas-bearing characteristics.

The highest values of TOC, pore volume, and specific surface area are found in the silica-rich high production shales, with an average of 4.182%, 33.04 x 10(-3) cm(3)/g, and 38.71 m(2)/g, respectively. The total pore volume and specific surface area in the clay-rich low production shales are 19.85% and 28.62% lower than that of silica-rich high production shales. This suggests that the types of lithofacies have a more prominent influence on the specific surface area of the shales, while the pore volume plays a smaller role. However, the pressure in silica-rich low production shales is often released due to strong tectonic deformation. The OM pores in the silica-rich low production shales therefore tend to be both compressed and closed, with low surface porosity and of round shape. The total pore volume and specific surface area of silica-rich low production shales are 34.63% and 22.0% lower than that of the silica-rich high production shales. This indicates that tectonic movement has a significant influence on the shale pore volume, while specific surface area has a smaller influence.

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输出日期: 2023-09-04

第 18 条，共 321 条

标题: Emission reduction effect and carbon market efficiency of carbon emissions trading policy in China

作者: Zhang, W (Zhang, Wei); Li, J (Li, Jing); Li, GX (Li, Guoxiang); Guo, SC (Guo, Shucen)

来源出版物: ENERGY 卷: 196 文献号: 117117 DOI: 10.1016/j.energy.2020.117117 出版年: APR 1 2020

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摘要: China has implemented its carbon emission trading system (ETS) in seven pilots since 2013. Many methods have been used to evaluate the effect and efficiency of the ETS in reducing carbon emissions. Evaluating the carbon ETS to determine whether it has co-benefited the economy and environment in the seven pilots is crucial for the development of China. Moreover, different methods of measurement reveal different results on how efficient the seven carbon emission trading markets (ETMs) are. We use the difference-in-differences (DID) method to evaluate the impact of carbon emissions and economic growth following ETS implementation. Based on the data of industrial carbon emissions in 30 provinces of China from 2008 to 2016, the impact of ETS on the carbon emission reduction and economic growth of enterprises is empirically tested. Data envelopment analysis (DEA) evaluates the operating efficiency of the carbon ETMs. Based on the seven carbon emission trading pilots conducted in China in 2014-2016, the carbon ETMs differentiation system in the pilot area is taken as the input index and the ETS implementation effect is used as the output index to construct the full DEA evaluation model for gauging the operation efficiency of the carbon ETMs. The results show that the implementation of the carbon trading policy increases the economic dividend (13.6%) generated by the gross industrial output value, but significantly reduces the emission (24.2%) of industrial CO2 in all seven carbon emission trading pilots. The average DEA efficiency of the seven carbon ETMs operations in China have increased annually. (C) 2020 Elsevier Ltd. All rights reserved.

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会议名称: 4th International Conference on Low Carbon Asia and Beyond (ICLCA)

会议日期: OCT 24-26, 2018

会议地点: Johor Bahru, MALAYSIA

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ESI 热点论文: N

输出日期: 2023-09-04

第 19 条，共 321 条

标题: Impacts of Drought on Maize and Soybean Production in Northeast China During the Past Five Decades

作者: Wang, CY (Wang, Chunyi); Linderholm, HW (Linderholm, Hans W.); Song, YL (Song, Yanling); Wang, F (Wang, Fang); Liu, YJ (Liu, Yanju); Tian, JF (Tian, Jinfeng); Xu, JX (Xu, Jinxia); Song, YB (Song, Yingbo); Ren, GY (Ren, Guoyu)

来源出版物: INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH 卷: 17 期: 7 文献号: 2459 DOI: 10.3390/ijerph17072459 出版年: APR 2020

Web of Science 核心合集中的 "被引频次": 60

被引频次合计: 63

摘要: Climate change has a distinct impact on agriculture in China, particularly in the northeast, a key agriculture area sensitive to extreme hydroclimate events. Using monthly climate and agriculture data, the influence of drought on maize and soybean yields-two of the main crops in the region-in northeast China since 1961 to 2017 were investigated. The results showed that the temperature in the growing season increased by 1.0 degrees C from the period 1998-2017 to the period 1961-1980, while the annual precipitation decreased slightly. However, precipitation trends varied throughout the growing season (May-September), increasing slightly in May and June, but decreasing in July, August and September, associated with the weakening of the East Asian summer monsoon. Consequently, the annual and growing season drought frequency increased by 15%, and 25%, respectively, in the period 1998-2017 relative to the period 1961-1980. The highest drought frequency (55%) was observed in September. At the same time, the drought intensity during the growing season increased by 7.8%. The increasing frequency and intensity of drought had negative influences on the two crops. During moderate drought years in the period 1961-2017, 3.2% and 10.4% of the provincial maize and soybean yields were lost, respectively. However, during more severe drought years, losses doubled for soybean (21.8%), but increased more than four-fold for maize (14.0%). Moreover, in comparison to the period 1961-1980, a higher proportion of the yields were lost in the period 1998-2017, particularly for maize, which increased by 15% (increase for soybean was 2.4%). This change largely depends on increasing droughts in August and September, when both crops are in their filling stages. The impact of drought on maize and soybean production was different during different growth stages, where a strong relationship was noted between drought and yield loss of soybean in its filling stage. Given the sensitivity of maize and soybean yields in northeast China to drought, and the observed production trends, climate change will likely have significant negative impacts on productivity in the future.

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第 20 条，共 321 条

标题: Highly-defective Fe-N-C catalysts towards pH-Universal oxygen reduction reaction

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来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 263 文献号: 118347 DOI: 10.1016/j.apcatb.2019.118347 出版年: APR 2020

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被引频次合计: 108

摘要: The defect engineering of nonprecious metal catalysts (NPMCs) is of significance to advance the oxygen reduction reaction (ORR) catalysts for the application of electrochemical energy devices. Herein, a facile H2O2 etching strategy is proposed to design Fe and N co-doped carbon catalysts (Fe-N-C/H2O2). Thanks to the etching of C, the defective carbon (DC) is endowed with robust anchoring ability, which is conducive to the modulation of active sites and microstructures, and further improvement of their ORR performances. Due to the supporting effect, the effective 3D nanostructures can be constructed. Integrated with the composition and morphology features, the resultant Fe-N-C/H2O2 achieves remarkable ORR performance with onset potential of 0.93 V and super stability with a subtle negative shift of 13.1 mV after 20 000 cycles in 0.1 M HClO4. Meanwhile, superior ORR performances are also revealed in alkaline and neutral electrolytes. This work provides an effective strategy for the design of advanced electrocatalysts towards fuel cells.

入藏号: WOS:000510526000059

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ESI 热点论文: N

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第 21 条，共 321 条

标题: Data-Driven Fault Diagnosis Method Based on Compressed Sensing and Improved Multiscale Network

作者: Hu, ZX (Hu, Zhong-Xu); Wang, Y (Wang, Yan); Ge, MF (Ge, Ming-Feng); Liu, J (Liu, Jie)

来源出版物: IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS 卷: 67 期: 4 页: 3216-3225 DOI: 10.1109/TIE.2019.2912763 出版年: APR 2020

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被引频次合计: 123

摘要: The diagnosis of the key components of rotating machinery systems is essential for the production efficiency and quality of manufacturing processes. The performance of the traditional diagnosis method depends heavily on feature extraction, which relies on the degree of individuals expertise or prior knowledge. Recently, a deep learning (DL) method is applied to automate feature extraction. However, training in the DL method requires a massive amount of sensor data, which is time consuming and poses a challenge for its applications in engineering. In this paper, a new data-driven fault diagnosis method based on compressed sensing (CS) and improved multiscale network (IMSN) is proposed to recognize and classify the faults in rotating machinery. CS is used to reduce the amount of raw data, from which the fault information is discovered. At the same time, it can be used to generate sufficient training samples for the subsequent learning. The one-dimensional compressed signal is converted to two-dimensional image for further learning. An IMSN is established for learning and obtaining deep features. It improves the diagnosis performance of the DL process. The faults of the key components are identified from a softmax model. Experimental analysis is performed to verify effectiveness of the proposed data-driven fault diagnosis method.

入藏号: WOS:000507307000068

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ESI 热点论文: N

输出日期: 2023-09-04

第 22 条，共 321 条

标题: The effects of projected climate change and extreme climate on maize and rice in the Yangtze River Basin, China

作者: Chen, XX (Chen, Xinxin); Wang, LC (Wang, Lunche); Niu, ZG (Niu, Zigeng); Zhang, M (Zhang, Ming); Li, CA (Li, Chang'an); Li, JR (Li, Jiarui)

来源出版物: AGRICULTURAL AND FOREST METEOROLOGY 卷: 282 文献号: 107867 DOI: 10.1016/j.agrformet.2019.107867 出版年: MAR 15 2020

Web of Science 核心合集中的 "被引频次": 81

被引频次合计: 90

摘要: crop yield is highly sensitive to climate change and extreme climate. Here, the impact of climate change and extreme climate was assessed based on the climate variable outputs from 17 General Circumstance Models (GCMs) in the Coupled Model Inter-comparison Project phase five (CMIP5) dataset, a statistically downscaling method, a series of 12 extreme climate indices selected from the Expert Team on Climate Change Detection and Indices (ETCCDI) calculated using the downscaled climate variable outputs and a process-base Crop Simulation Model (CSM). The climate variable outputs consist history data series (1961-2005) of GCMs simulation used as baseline, future period (2006-2050) including two Representative Concentration Pathways (RCPs), 4.5 and 8.5 in the Yangtze River Basin. The results showed that: (1) the mean temperature and precipitation in growing season would increase for 81 stations for the future period under RCP4.5 and RCP8.5 relative to baseline in the Yangtze River Basin. In contrast, the mean downward shortwave solar radiation in growing season at most sites presented an upward trend for the future period under RCP4.5 and RCP8.5 relative to baseline in the Yangtze River Basin; (2) the maize and rice yield was projected to decrease by approximately 5.36% and 2.55% under RCP4.5 and 6.04% and 2.48% under RCP8.5, respectively, relative to baseline with consideration of the CO2 effect; (3) The maize and rice yield would be lowered by 2.995% and 2.268% with a 1 degrees C increase in the mean growing season temperature, respectively. Conversely, the maize and rice yield would increase by approximately 6.947% and 2.885% with a 1 MJ m(-2) increase in the mean growing season downward shortwave solar radiation, respectively. Extreme climate indices were strongly correlated with the maize and rice yield, especially in the number of days above temperature threshold, maximum number of consecutive days with precipitation <1 mm, maximum daily highest temperature, number of heavy precipitation when precipitation >= 10 mm and precipitation >= 20 mm in the Yangtze River Basin. Although uncertainties might arise from not considering the adaptation strategies, this study highlights how climate change including temperature, solar radiation, water use and extreme climate will affect the maize and rice yield in the Yangtze River Basin.

入藏号: WOS:000525813300012

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输出日期: 2023-09-04

第 23 条，共 321 条

标题: Aggregation-Induced Emission Photosensitizers: From Molecular Design to Photodynamic Therapy

作者: Dai, J (Dai, Jun); Wu, X (Wu, Xia); Ding, SY (Ding, Siyang); Lou, XD (Lou, Xiaoding); Xia, F (Xia, Fan); Wang, SX (Wang, Shixuan); Hong, YN (Hong, Yuning)

来源出版物: JOURNAL OF MEDICINAL CHEMISTRY 卷: 63 期: 5 页: 1996-2012 DOI: 10.1021/acs.jmedchem.9b02014 出版年: MAR 12 2020

Web of Science 核心合集中的 "被引频次": 130

被引频次合计: 132

摘要: Photodynamic therapy (PDT) has emerged as a promising noninvasive treatment option for cancers and other diseases. The key factor that determines the effectiveness of PDT is the photosensitizers (PSs). Upon light irradiation, the PSs would be activated, produce reactive oxygen species (ROS), and induce cell death. One of the challenges is that traditional PSs adopt a large flat disc-like structure, which tend to interact with the adjacent molecules through strong p-p stacking that reduces their ROS generation ability. Aggregation-induced emission (AIE) molecules with a twisted configuration to suppress strong intermolecular interactions represent a new class of PSs for image-guided PDT. In this Miniperspective, we summarize the recent progress on the design rationale of AIE-PSs and the strategies to achieve desirable theranostic applications in cancers. Subsequently, approaches of combining AIE-PS with other imaging and treatment modalities, challenges, and future directions are addressed.

入藏号: WOS:000526403900014

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第 24 条，共 321 条

标题: Robust and Stable Acidic Overall Water Splitting on Ir Single Atoms

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摘要: Single-atom electrocatalysts (SAEs) can realize the target of low-cost by maximum atomic efficiency. However, they usually suffer performance decay due to high energy states, especially in a harsh acidic water splitting environment. Here, we conceive and realize a double protecting strategy that ensures robust acidic water splitting on Ir SAEs by dispersing Ir atoms in/onto Fe nanoparticles and embedding IrFe nanoparticles into nitrogen-doped carbon nanotubes (Ir-SA@Fe@NCNT). When Ir-SA@Fe@NCNT acts as a bifunctional electrocatalyst at ultralow Ir loading of 1.14 mu g cm(-2), the required overpotentials to deliver 10 mA cm(-2) are 250 and 26 mV for oxygen evolution reaction (OER) and hydrogen evolution reaction (HER) in 0.5 M H2SO4 electrolyte corresponding to 1370- and 61-fold better mass activities than benchmark IrO, and Pt/C at an overpotential of 270 mV, respectively, resulting in only 1.51 V to drive overall water splitting. Moreover, remarkable stability is also observed compared to Pt/C-IrO2.

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标题: Deep high-temperature hydrothermal circulation in a detachment faulting system on the ultra-slow spreading ridge

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摘要: Coupled magmatic and tectonic activity plays an important role in high-temperature hydrothermal circulation at mid-ocean ridges. The circulation patterns for such systems have been elucidated by microearthquakes and geochemical data over a broad spectrum of spreading rates, but such data have not been generally available for ultra-slow spreading ridges. Here we report new geophysical and fluid geochemical data for high-temperature active hydrothermal venting at Dragon Horn area (49.7 degrees E) on the Southwest Indian Ridge. Twin detachment faults penetrating to the depth of 13 +/- 2 km below the seafloor were identified based on the microearthquakes. The geochemical composition of the hydrothermal fluids suggests a long reaction path involving both mafic and ultramafic lithologies. Combined with numerical simulations, our results demonstrate that these hydrothermal fluids could circulate similar to 6 km deeper than the Moho boundary and to much greater depths than those at Trans-Atlantic Geotraverse and Logachev-1 hydrothermal fields on the Mid-Atlantic Ridge.

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第 26 条，共 321 条

标题: Mesozoic Orogenic Gold Mineralization in the Jiaodong Peninsula, China: A Focused Event at 120 +/- 2 Ma During Cooling of Pregold Granite Intrusions

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来源出版物: ECONOMIC GEOLOGY 卷: 115 期: 2 页: 415-441 DOI: 10.5382/econgeo.4716 出版年: MAR 1 2020

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摘要: Jiaodong gold deposits are mainly sited along faulted contacts between Upper Jurassic Linglong granite and Precambrian basement metamorphic rocks or Lower Cretaceous Guojialing granite. Long-standing controversies relate to timing of gold mineralization and granite-gold relationships. In this study, gold-related muscovite consistently provides concordant 40Ar/39Ar plateau ages of 120 +/- 2 Ma (2 sigma) for the Jiaojia, Sizhuang, and Luoshan deposits. Analogous 40Ar/39Ar timing constraints from gold-related muscovite are provided by total gas and high-temperature ages from Fushun, concordant high-temperature ages from Rushan, and fusion-step ages from Xiadian deposits. These new 40Ar/39Ar ages, when combined with previous reliable 40Ar/39Ar and U-Pb age constraints for mineralization, including ages of pre- and postgold dikes, define a widespread gold mineralization event at 120 +/- 2 Ma (2 sigma). Published zircon U-Pb ages for Guojialing and Aishan granite magmatism suggest an similar to 8-m.y. lag between peak intrusive activity and gold mineralization. This, together with lack of both high-temperature alteration assemblages and alteration and/or metal zonation, indicates that the structurally controlled Jiaodong deposits are orogenic rather than intrusion-related deposits. Despite this, granite intrusions are considered to have provided suitable fluid trap sites. New 40Ar/39Ar analyses of biotite from the Linglong and Guojialing granites show they had cooled to about similar to 300 degrees +/- 50 degrees C by ca. 123 to 124 Ma, providing pressuretemperature conditions similar to those under which most orogenic gold deposits formed close to the ductilebrittle transition. This enabled the effective ingress of fluids at supralithostatic pressures at 120 +/- 2 Ma, leading to intensive brecciation, alteration, and deposition of both vein-type and disseminated gold ores. New zircon (U-Th)/He dates together with apatite fission-track data indicate that preservation of the gold province is due to slow postmineralization uplift and exhumation.

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第 27 条，共 321 条

标题: BS-Nets: An End-to-End Framework for Band Selection of Hyperspectral Image

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来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 58 期: 3 页: 1969-1984 DOI: 10.1109/TGRS.2019.2951433 出版年: MAR 2020

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摘要: Hyperspectral image (HSI) consists of hundreds of continuous narrowbands with high spectral correlation, which would lead to the so-called Hughes phenomenon and the high computational cost in processing. Band selection (BS) has been proven to be effective in avoiding such problems by removing redundant bands. However, many existing BS methods separately estimate the significance for every single band and cannot fully consider the nonlinear and global interaction between spectral bands. In this article, by assuming that a complete HSI band set can be reconstructed from its few informative bands, we propose a unified BS framework, BS Network (BS-Net). The framework consists of a band attention module (BAM), which aims to explicitly model the nonlinear interdependences between spectral bands, and a reconstruction network (RecNet), which is used to restore the original HSI from the learned informative bands, resulting in a flexible architecture. The resulting framework is end-to-end trainable, making it easier to train from scratch and to combine with many existing networks. We implement two versions of BS-Nets, respectively, using fully connected networks (BS-Net-FC) and convolutional neural networks (BS-Net-Conv), and extensively compare their results with popular existing BS approaches on three real hyperspectral data sets, showing that the proposed BS-Nets can accurately select informative band subset with less redundancy and outperform the competitors in terms of classification accuracy with competitive time cost.

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第 28 条，共 321 条

标题: A relaxed quadratic function negative-determination lemma and its application to time-delay systems

作者: Zhang, CK (Zhang, Chuan-Ke); Long, F (Long, Fei); He, Y (He, Yong); Yao, W (Yao, Wei); Jiang, L (Jiang, Lin); Wu, M (Wu, Min)

来源出版物: AUTOMATICA 卷: 113 文献号: 108764 DOI: 10.1016/j.automatica.2019.108764 出版年: MAR 2020

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摘要: The quadratic function with respect to the time-varying delay has often been introduced for the analysis of systems with time-varying delays. To determine the negative definiteness of such function, this paper develops a parameter-adjustable-based lemma, which contains the lemma popularly used in literature as a special case and has potential to reduce the conservatism without requiring extra decision variables. A stability criterion for a linear time-delay system is established by using the proposed lemma, whose advantage is demonstrated via a numerical example, and the criterion is finally applied to analyze the stability of load frequency control scheme for a single-area power system. (C) 2019 Elsevier Ltd. All rights reserved.

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第 29 条，共 321 条

标题: Analysis of Lower Cambrian shale gas composition, source and accumulation pattern in different tectonic backgrounds: A case study of Weiyuan Block in the Upper Yangtze region and Xiuwu Basin in the Lower Yangtze region

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摘要: Marine shale gas exploration in southern China has successes and failures. Under the condition of great hydrocarbon generation material basis, shale gas wells drilled from some shale gas blocks are rich in methane, while the wells in other shale gas blocks with high nitrogen and low hydrocarbon gas, which indicates that they have different accumulation mechanisms. Therefore, the study of gas composition in shale will help us to figure out the mechanism of shale gas accumulation and loss. In this paper, the Lower Cambrian shale from Wei-201 well in Upper Yangtze Weiyuan Block and Jiangye-1 well from Lower Yangtze Xiuwu Basin are selected as research object, and shale samples are used for tests and experiments including analysis of gas composition and nitrogen isotope, test of porosity and TOC content, overburden permeability test, permeability test before and after methane adsorption under different osmotic pressure, permeability test parallel and vertical to the bedding surface, FIB-SEM (Focus Ion Beam Scanning Electron Microscope) and FIB-HIM (Focused Ion Beam Helium Ion Microscope). Finally, the reasons for the difference in the gas components of the Lower Cambrian shale gas in Weiyuan Block and Xiuwu Basin are studied by means of seismic interpretation, core description and outcrop observation besides the tests and experiments. The results show that the gas components of the Lower Cambrian shale in Weiyuan Block, the Upper Yangtze, mainly consist of methane, derived from liquid hydrocarbon cracking. The sealing capacity of roof and floor, the great self-sealing of shale and the flat anticline structure contribute to the high methane content in shale gas. The Lower Cambrian shale gas in Xiuwu Basin, the Lower Yangtze, is mostly nitrogen, which is derived both from atmosphere and deep crust-upper mantle. The detachment layer at the bottom of the Lower Cambrian, the widely developed deep faults and the Jurassic volcanic activity are the reasons for the high nitrogen and low hydrocarbon of shale gas. Based on the above analysis, the patterns are summarized for shale gas accumulation in the simple anticline background and reservoir destruction in the complex syncline background.

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第 30 条，共 321 条

标题: Permeability of hydrate-bearing sediments

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来源出版物: EARTH-SCIENCE REVIEWS 卷: 202 文献号: 103100 DOI: 10.1016/j.earscirev.2020.103100 出版年: MAR 2020

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摘要: Natural gas hydrate is one of the most potential carbon energy resources because of its tremendous reserves. Gas and water permeability of natural gas hydrate-bearing sediments (HBS) directly affects gas recovery from hydrate reservoirs and gas production efficiency. In this paper, we review the permeability of HBS with respect to its relevant factors and development in characterization. Hydrate morphology and distribution inherently affect the permeability, and are identified in both coarse- and fine-grained sediments. Measurement and estimation methods of permeability are discussed in four aspects: theoretical analysis and numerical simulation, laboratory experiment, and filed test. Research challenges to this subject are comprehensively discussed, and future prospects of research are addressed. We suggest that future research should focus on understanding hydrate formation and dissociation mechanism and their effect on the permeability in fine-grained sediments, obtaining reliable measurement results of the permeability, bridging the gap of permeability between laboratory samples and natural sediments, and highlighting multi-scale analysis on the permeability with appropriate parameters as well as developing models for safe and economically feasible gas production from HBS eventually.

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第 31 条，共 321 条

标题: Effects of heterogeneous technological progress on haze pollution: Evidence from China

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来源出版物: ECOLOGICAL ECONOMICS 卷: 169 文献号: 106533 DOI: 10.1016/j.ecolecon.2019.106533 出版年: MAR 2020

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摘要: Technological progress plays an important role in combating haze pollution in the long run. However, existing studies often ignore the inconsistent effects on the reduction of haze brought by different types of technological progress. Considering the potential heterogeneity among technological progress, this paper constructs a theoretical framework to analyse the impact of heterogeneous technological progress on haze pollution, using annual data from 30 provinces and cities in China for the period of 2003 to 2016. A systematic GMM method is applied to empirically test the effects of neutral technological progress and biased technological progress on haze pollution. The results show that first, due to cost-reduction effect and income effect, neutral technological progress and labour-saving technological progress are conducive to haze reduction; while the impact of capital-saving technological progress on haze pollution is insignificant. Second, because of the energy rebound effect, energy-saving technological progress cannot effectively reduce haze pollution. Third, the haze-reduction effects of different types of technological progress show significant regional heterogeneity in China. Last, in terms of the control variables, strengthening environmental regulation is the only factor that can be helpful in haze reduction, others intensify haze pollution.

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第 32 条，共 321 条

标题: Environmental regulation, Foreign investment behavior, and carbon emissions for 30 provinces in China

作者: Zhang, W (Zhang, Wei); Li, GX (Li, Guoxiang); Uddin, MK (Uddin, Md Kamal); Guo, SC (Guo, Shucen)

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摘要: Using the panel data of 30 provincial-level administrative regions in China (excluding Tibet, Hong Kong, Macao, and Taiwan), a threshold regression model was used to empirically analyze the impact of environmental regulation and foreign investment behavior on the amount and intensity of carbon emissions. The results showed that: First, there is a significant inverted "U"-shaped relationship between environmental regulation and carbon emissions. With improved environmental regulation, the positive effects of environmental regulation in reducing the amount and intensity of carbon emissions are more obvious. Next, foreign investment behavior under environmental regulations can reduce the amount and intensity of carbon emissions. Finally, In terms of regional heterogeneity, foreign investment behavior in the eastern and central regions can curb carbon emissions, the opposite effect is seen in the western region. With improved environmental regulations for relatively high-emission intensity regions, foreign direct investment (FDI) in low-emission intensity regions can significantly reduce carbon emissions. It is necessary to formulate differentiated environmental regulation based on regional development. Foreign investment behavior should be standardized to improve the quality of FDI and avoid making China a "pollution paradise" for FDI. (c) 2019 Elsevier Ltd. All rights reserved.

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第 33 条，共 321 条

标题: Flood susceptibility mapping using convolutional neural network frameworks

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来源出版物: JOURNAL OF HYDROLOGY 卷: 582 文献号: 124482 DOI: 10.1016/j.jhydrol.2019.124482 出版年: MAR 2020

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摘要: Flood is a very destructive natural disaster in the world, which seriously threatens the safety of human life and property. In this paper, the most popular convolutional neural network (CNN) is introduced to assess flood susceptibility in Shangyou County, China. The main contributions of this study are summarized as follows. First, the CNN technique is used for flood susceptibility mapping through two different CNN classification and feature extraction frameworks. Second, three data presentation methods are designed in the CNN architecture to fit the two proposed frameworks. To construct the proposed CNN-based methods, 13 flood triggering factors related to historical flood events in the study area were prepared. The performance of these CNN-based methods was evaluated using several objective criteria in comparison to the conventional support vector machine (SVM) classifier. Experiments results demonstrate that all the CNN-based methods can produce more reliable and practical flood susceptibility maps. For example, the proposed CNN-based classifiers were 0.022-0.054 higher than SVM in terms of area under the curve (AUC). In addition, in the classification process, CNN-based feature extraction can effectively improve the prediction capability of SVM by 0.021-0.051 in terms of AUC. Therefore, the proposed CNN frameworks can help mitigate and manage floods.

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第 34 条，共 321 条

标题: One-step synthesis of novel K+ and cyano groups decorated triazine-/heptazine-based g-C3N4 tubular homojunctions for boosting photocatalytic H-2 evolution

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摘要: Constructing homojunctions with different morphologies, exposing facets, crystal phases or semiconductor types in a photocatalyst is an essential approach to boost the photoactivity. Herein, the g-C3N4 phase homojunctions decorated with cyano groups and K+ were designed and successfully synthesized via only adjusting the reaction temperatures within a facile one-step molten salt route. Such unique junctions were constructed through the overgrowth of triazine-based g-C3N4 nanoparticles embedded in the surface and inner wall of heptazine-based g-C3N4 hollow tubes. Benefited from the multiple advantages of high specific surface area, unique tubular structure, enhanced visible light absorption, and fast charge transfer and separation, the triazine-/heptazine-based g-C3N4 homojunctions drastically enhanced the photocatalytic hydrogen production performance, achieving a 2 and 12-fold improvement than the pristine g-C3N4 microtube and bulk g-C3N4, respectively. This study provides an in-depth insight into the design and fabrication of other g-C3N4 -based photocatalysts for more efficient solar energy conversion applications.

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第 35 条，共 321 条

标题: Enhanced piezoelectric-effect-assisted photoelectrochemical performance in ZnO modified with dual cocatalysts

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摘要: Promising strategies are of great significance for designing photoelectrodes with high charge separation efficiency and low charge recombination rate in photoelectrochemical (PEC) water splitting. In this paper, we firstly propose a method of combining piezoelectric effect with photoelectrochemical cell by utilizing of direct band gap metal-oxide semiconductor ZnO as the photoanode. After introducing piezoelectric effect resulted from ultrasonic vibrations, the current density value reaches 0.45 mA.cm(-2) at 1.23 V-RHE by the production of strain-induced charge and the enhancement of the electric field, 1.7 times higher than that of ZnO without ultrasonic vibrations (0.27 mA.cm(-2) at 1.23 V-RHE). The deposition of spatially separated dual cocatalysts, of which the bottom Pt act as electron collection and transport layer while the outmost Co-Pi serve as hole-transfer layer, further facilitates the separation of charge (strain-induced and photogenerated) and accelerates the reaction kinetics. The utilization of dual cocatalysts efficiently improves the performance of photoanodes and leads to a current density of 0.80 mA.cm(-2) at 1.23 V-RHE, 1.8 and 3.0 times higher than the values of ZnO with and without ultrasonic vibrations. The strategy provides a promising method and idea for the manufacture of practical and high-performance electrodes.

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第 36 条，共 321 条

标题: Strategies for Designing Antithermal-Quenching Red Phosphors

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摘要: Nowadays, red phosphor plays a key role in improving the lighting quality and color rendering index of phosphor-converted white light emitting diodes (w-LEDs). However, the development of thermally stable and highly efficient red phosphor is still a pivotal challenge. Herein, a new strategy to design antithermal-quenching red emission in Eu3+, Mn4+-codoped phosphors is proposed. The photoluminescence intensity of Mg3Y2(1-y)Ge3O12:yEu(3+), Mn4+ (0 <= y <= 1) phosphors continuously enhances with rising temperature from 298 to 523 K based on Eu3+ -> Mn4+ energy transfer. For Mg3Eu2Ge3O12:Mn4+ sample, the integrated intensity at 523 K remarkably reaches 120% of that at 298 K. Interestingly, through codoping Eu3+ and Mn4+ in Mg3Y2Ge3O12, the photoluminescence color is controllably tuned from orangish-red (610 nm) to deep-red (660 nm) light by changing Eu3+ concentration. The fabricated w-LEDs exhibit superior warm white light with low corrected color temperature (CCT = 4848 K) and high color rendering index (R-a = 96.2), indicating the promising red component for w-LED applications. Based on the abnormal increase in antistokes peaks of Mn4+ with temperatures, Mg3Eu2Ge3O12:Mn4+ phosphor also presents a potential application in optical thermometry sensors. This work initiates a new insight to construct thermally stable and spectra-tunable red phosphors for various optical applications.

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第 37 条，共 321 条

标题: Macroscopic Spontaneous Polarization and Surface Oxygen Vacancies Collaboratively Boosting CO2 Photoreduction on BiOIO3 Single Crystals

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摘要: Prompt recombination of photogenerated electrons and holes in bulk and on the surface of photocatalysts harshly impedes the photocatalytic efficiency. However, the simultaneous manipulation of photocharges in the two locations is challenging. Herein, the synchronous promotion of bulk and surface separation of photoinduced charges for prominent CO2 photoreduction by coupling macroscopic spontaneous polarization and surface oxygen vacancies (OVs) of BiOIO3 single crystals is reported. The oriented growth of BiOIO3 single-crystal nanostrips along the [001] direction, ensuing substantial well-aligned IO3 polar units, renders a large enhancement for the macroscopic polarization electric field, which is capable of driving the rapid separation and migration of charges from bulk to surface. Meanwhile the introduction of surface OVs establishes a local electric field for charge migration to catalytic sites on the surface of BiOIO3 nanostrips. Highly polarized BiOIO3 nanostrips with ample OVs demonstrate outstanding CO2 reduction activity for CO production with a rate of 17.33 mu mol g(-1) h(-1) (approximately ten times enhancement) without any sacrificial agents or cocatalysts, being one of the best CO2 reduction photocatalysts in the gas-solid system reported so far. This work provides an integrated solution to governing charge movement behavior on the basis of collaborative polarization from bulk and surface.

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第 38 条，共 321 条

标题: Biochar-supported nanoscale zero-valent iron as an efficient catalyst for organic degradation in groundwater

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摘要: High-efficiency and cost-effective catalysts are critical to completely mineralization of organic contaminants for in-situ groundwater remediation via advanced oxidation processes (AOPs). The engineered biochar is a promising method for waste biomass utilization and sustainable remediation. This study engineers maize stalk (S)and maize cob (C)-derived biochars (i.e., SB300, SB600, CB300, and CB600, respectively) with oxygen-containing functional groups as a carbon-based support for nanoscale zero-valent iron (nZVI). Morphological and physiochemical characterization showed that nZVI could be impregnated within the framework of the synthesized Fe-CB600 composite, which exhibited the largest surface area, pore volume, iron loading capacity, and Fe-0 proportion. Superior degradation efficiency (100% removal in 20 min) of trichloroethylene (TCE, 0.1 mM) and fast pseudo-first-order kinetics (k(obs) =22.0 ( -1)) were achieved via peroxymonosulfate (PMS, 5 mM) activation by the Fe-CB600 (1 g L-1) under groundwater condition (bicarbonate buffer solution at pH = 8.2). Superoxide radical and singlet oxygen mediated by Fe-0 and oxygen-containing group (i.e., C=O) were demonstrated as the major reactive oxygen species (ROSs) responsible for TCE dechlorination. The effectiveness and mechanism of the Fe/C composites for rectifying organic-contaminated groundwater were depicted in this study.

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标题: Jute: A Potential Candidate for Phytoremediation of Metals-A Review

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摘要: Jute (Corchorus capsularis) is a widely cultivated fibrous species with important physiological characteristics including biomass, a deep rooting system, and tolerance to metal stress. Furthermore, Corchorus species are indigenous leafy vegetables and show phytoremediation potential for different heavy metals. This species has been used for the phytoremediation of different toxic pollutants such as copper (Cu), cadmium (Cd), zinc (Zn), mercury (Hg) and lead (Pb). The current literature highlights the physiological and morphological characteristics of jute that are useful to achieve successful phytoremediation of different pollutants. The accumulation of these toxic heavy metals in agricultural regions initiates concerns regarding food safety and reductions in plant productivity and crop yield. We discuss some innovative approaches to increase jute phytoremediation using different chelating agents. There is a need to remediate soils contaminated with toxic substances, and phytoremediation is a cheap, effective, and in situ alternative, and jute can be used for this purpose.

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标题: Landslide Susceptibility Prediction Based on Remote Sensing Images and GIS: Comparisons of Supervised and Unsupervised Machine Learning Models

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摘要: Landslide susceptibility prediction (LSP) has been widely and effectively implemented by machine learning (ML) models based on remote sensing (RS) images and Geographic Information System (GIS). However, comparisons of the applications of ML models for LSP from the perspectives of supervised machine learning (SML) and unsupervised machine learning (USML) have not been explored. Hence, this study aims to compare the LSP performance of these SML and USML models, thus further to explore the advantages and disadvantages of these ML models and to realize a more accurate and reliable LSP result. Two representative SML models (support vector machine (SVM) and CHi-squared Automatic Interaction Detection (CHAID)) and two representative USML models (K-means and Kohonen models) are respectively used to scientifically predict the landslide susceptibility indexes, and then these prediction results are discussed. Ningdu County with 446 recorded landslides obtained through field investigations is introduced as case study. A total of 12 conditioning factors are obtained through procession of Landsat TM 8 images and high-resolution aerial images, topographical and hydrological spatial analysis of Digital Elevation Modeling in GIS software, and government reports. The area value under the curve of receiver operating features (AUC) is applied for evaluating the prediction accuracy of SML models, and the frequency ratio (FR) accuracy is then introduced to compare the remarkable prediction performance differences between SML and USML models. Overall, the receiver operation curve (ROC) results show that the AUC of the SVM is 0.892 and is slightly greater than the AUC of the CHAID model (0.872). The FR accuracy results show that the SVM model has the highest accuracy for LSP (77.80%), followed by the CHAID model (74.50%), the Kohonen model (72.8%) and the K-means model (69.7%), which indicates that the SML models can reach considerably better prediction capability than the USML models. It can be concluded that selecting recorded landslides as prior knowledge to train and test the LSP models is the key reason for the higher prediction accuracy of the SML models, while the lack of a priori knowledge and target guidance is an important reason for the low LSP accuracy of the USML models. Nevertheless, the USML models can also be used to implement LSP due to their advantages of efficient modeling processes, dimensionality reduction and strong scalability.

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第 41 条，共 321 条

标题: A holistic model for the origin of orogenic gold deposits and its implications for exploration

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摘要: The term orogenic gold deposits has been widely accepted, but there has been continuing debate on their genesis. Early syn-sedimentary or syn-volcanic models and hydrothermal meteoric-fluid models are now invalid. Magmatic-hydrothermal models fail because of the lack of consistent spatially associated granitic intrusions and inconsistent temporal relationships. The most plausible models involve metamorphic fluids, but the source of these fluids is equivocal. Intra-basin sources within deeper segments of the hosting supracrustal successions, the underlying continental crust, subducted oceanic lithosphere with its overlying sediment wedge, and metasomatized lithosphere are all potential sources. Several features of Precambrian orogenic gold deposits are inconsistent with derivation from a continental metamorphic-fluid source. These include the presence of hypozonal deposits in amphibolite-facies domains, their anomalous multiple sulfur isotopic compositions, and problems of derivation of gold-related elements from devolatilization of dominant basalts in the sequences. The Phanerozoic deposits are largely described as hosted in greenschist-facies domains, consistent with supracrustal devolatilization models. A notable exception is the Jiaodong gold deposits of China, where ca. 120-Ma gold deposits are hosted in Precambrian crust that was metamorphosed over 2000 million years prior to gold mineralization. Other deposits in China are comparable to those in the Massif Central and elsewhere in France, in that they are hosted in amphibolite-facies domains or clearly post-date regional metamorphic events imposed on hosting supracrustal sequences. If all orogenic gold deposits have a common genesis, the only realistic source of fluid and gold is from devolatilization of a subducted oceanic slab with its overlying gold-bearing sulfide-rich sedimentary package, or the associated metasomatized mantle wedge, with CO2 released during decarbonation and S- and ore-related elements released from transformation of pyrite to pyrrhotite at about 500 degrees C. Although this model satisfies all geological, geochronological, isotopic, and geochemical constraints, and is consistent with limited computer-based modeling of fluid release from subduction zones, the precise mechanisms of fluid flux are model-driven and remain uncertain. From an exploration viewpoint, the model re-emphasizes the ubiquitous occurrence of orogenic gold deposits in subduction-related orogenic belts and importance of continental-scale lithosphere-tapping fault and shear zones to focus large volumes of auriferous fluid. It confirms the importance of the consistent spacing between world-class deposits, broadly equivalent to the depth of the Moho, as derived from empirical observations.

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第 42 条，共 321 条

标题: Application of nuclear magnetic resonance (NMR) in coalbed methane and shale reservoirs: A review

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摘要: Nuclear magnetic resonance (NMR) has been applied widely and successfully in conventional and unconventional reservoirs, and can be used to investigate petrophysical properties and fluid flow characteristics. This non-destructive, sensitive, and quick technique has been utilized in determination of pore type, porosity, pore size distribution, permeability prediction, wettability estimation, and fluid type, state and flow behavior.

In this paper, the application of NMR to investigate coalbed methane and shale reservoirs is reviewed. Most of the reviewed studies are related to porosity and pore characteristics, which can be determined by analyzing the characteristics of the T-2 distribution, allowing for examination of pore type and pore connectivity as well as calculation of total porosity and pore size distribution. Permeability models developed for reservoir rocks and based on porosity determined using NMR are well established and have been extended or modified to evaluate the permeability of coal or shale. Reviewed studies also include wettability investigation by comparing the subtraction of T-2 distribution before and after fluid injection. Reviewed recent advances have further discussed the method of distinguishing fluid type, fluid state, and simulating fluid behavior using one-dimensional and two-dimensional NMR methods combined with changes of T-2 distribution. The aim of this review is to provide readers with an overview of the capabilities of NMR and its extension to scientific research by improving the parameter optimization of the instrument and establishing the calculation method for effective surface relaxivity for coals or shales.

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第 43 条，共 321 条

标题: A new multi-stable fractional-order four-dimensional system with self-excited and hidden chaotic attractors: Dynamic analysis and adaptive synchronization using a novel fuzzy adaptive sliding mode control method

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摘要: Four-dimensional chaotic systems are a very interesting topic for researchers, given their special features. This paper presents a novel fractional-order four-dimensional chaotic system with self-excited and hidden attractors, which includes only one constant term. The proposed system presents the phenomenon of multi-stability, which means that two or more different dynamics are generated from different initial conditions. It is one of few published works in the last five years belonging to the aforementioned category. Using Lyapunov exponents, the chaotic behavior of the dynamical system is characterized, and the sensitivity of the system to initial conditions is determined. Also, systematic studies of the hidden chaotic behavior in the proposed system are performed using phase portraits and bifurcation transition diagrams. Moreover, a design technique of a new fuzzy adaptive sliding mode control (FASMC) for synchronization of the fractional-order systems has been offered. This control technique combines an adaptive regulation scheme and a fuzzy logic controller with conventional sliding mode control for the synchronization of fractional-order systems. Applying Lyapunov stability theorem, the proposed control technique ensures that the master and slave chaotic systems are synchronized in the presence of dynamic uncertainties and external disturbances. The proposed control technique not only provides high performance in the presence of the dynamic uncertainties and external disturbances, but also avoids the phenomenon of chattering. Simulation results have been presented to illustrate the effectiveness of the presented control scheme. (C) 2019 Elsevier B.V. All rights reserved.

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第 44 条，共 321 条

标题: An enhanced adaptive differential evolution algorithm for parameter extraction of photovoltaic models

作者: Li, SJ (Li, Shuijia); Gu, Q (Gu, Qiong); Gong, WY (Gong, Wenyin); Ning, B (Ning, Bin)

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摘要: Parameter extraction of photovoltaic models based on measured current-voltage data plays an important role in the simulation, control, and optimization of photovoltaic systems. Although many parameter extraction techniques have been devoted to solving this problem, they may suffer from some deficiencies. In this paper, an enhanced adaptive differential evolution algorithm is proposed to extract photovoltaic parameters fast, accurately and reliably. In proposed method, the crossover rate sorting mechanism is introduced to assign each individual to an adapted crossover rate value according to their fitness values, which allows good elements to be more inherited in next generation. In addition, a dynamic population reduction strategy is used to improve the convergence speed and balance the exploration and exploitation. The performance of proposed method is confirmed by extracting parameters of different photovoltaic models, i.e., single diode, double diode, and photovoltaic modules. The simulated results show that the proposed method exhibits competitive performance on accuracy, reliability and convergence speed compared with other state-of-the-art algorithms. Further, the test results on experimental data from the manufacturers data sheet also indicate that the proposed algorithm can obtain superior solutions at different irradiance and temperature. Therefore, the proposed method can be an effective and efficient alternative for parameter extraction of photovoltaic models.

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第 45 条，共 321 条

标题: Effects of agricultural abandonment on soil aggregation, soil organic carbon storage and stabilization: Results from observation in a small karst catchment, Southwest China

作者: Liu, M (Liu, Man); Han, GL (Han, Guilin); Zhang, Q (Zhang, Qian)

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摘要: Soil organic carbon (SOC) storage and stabilization under land-use change, including agricultural abandonment, are critical for the recuperation of soil productivity and feedback to climate change. A space-for-time substitution approach was applied to investigate the responses of soil aggregation, SOC storage and stabilization to agricultural abandonment in a small karst catchment in Southwest China. Soil aggregate distribution, SOC concentration and delta C-13 composition in bulk soils and different-sized aggregates in soil profiles under cropland, abandoned cropland and native vegetation land were determined. The results showed that SOC storage and soil aggregation were significantly reduced in the surface soils of croplands compared to those under native vegetation; SOC storage was slowly restored in 3-8 years abandoned cropland, but soil aggregation was rapidly recovered. The rapidly recovered macro-aggregates controlled the recuperation of SOC storage after agricultural abandonment because most SOC (64%-83%) was sequestrated by macro-aggregates. The relationships between SOC concentrations and delta C-13 values in different-sized aggregates of surface soils could indicate a change in SOC stabilization under land-use change. In this study, SOC stabilization was gradually enhanced following agricultural abandonment. These results suggest that soil aggregation, SOC storage and stabilization are recovered following agricultural abandonment in the karst region.

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第 46 条，共 321 条

标题: Global projections of future urban land expansion under shared socioeconomic pathways

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摘要: Despite its small land coverage, urban land and its expansion have exhibited profound impacts on global environments. Here, we present the scenario projections of global urban land expansion under the framework of the shared socioeconomic pathways (SSPs). Our projections feature a fine spatial resolution of 1km to preserve spatial details. The projections reveal that although global urban land continues to expand rapidly before the 2040s, China and many other Asian countries are expected to encounter substantial pressure from urban population decline after the 2050s. Approximately 50-63% of the newly expanded urban land is expected to occur on current croplands. Global crop production will decline by approximately 1-4%, corresponding to the annual food needs for a certain crop of 122-1389 million people. These findings stress the importance of governing urban land development as a key measure to mitigate its negative impacts on food production.

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第 47 条，共 321 条

标题: A high-resolution summary of Cambrian to Early Triassic marine invertebrate biodiversity

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摘要: One great challenge in understanding the history of life is resolving the influence of environmental change on biodiversity. Simulated annealing and genetic algorithms were used to synthesize data from 11,000 marine fossil species, collected from more than 3000 stratigraphic sections, to generate a new Cambrian to Triassic biodiversity curve with an imputed temporal resolution of 26 14,9 thousand years. This increased resolution clarifies the timing of known diversification and extinction events. Comparative analysis suggests that partial pressure of carton dioxide (Pco(2)) is the only environmental factor that seems to display a secular pattern similar to that of biodiversity, but this similarity was not confirmed when autocorrelation within that time series was analyzed by detrending These results demonstrate that fossil data can provide the temporal and taxonomic resolutions necessary to test (paleo)biological hypotheses at a level of detail approaching those of long-term ecological analyses.

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第 48 条，共 321 条

标题: A ratiometric optical thermometer with multi-color emission and high sensitivity based on double perovskite LaMg0.402Nb0.598O3: Pr3+ thermochromic phosphors

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摘要: Currently, non-contact fluorescence intensity ratio (FIR)-based luminescent thermometry has been extensively attracted great attention for its promising applications in electromagnetic field, micro-temperature field and thermally harsh environments. In this work, the double-perovskite LaMg0.402Nb0.598O3: Pr3+ (LMNO: Pr3+) thermometric phosphor is firstly designed and successfully synthesized via a high-temperature solid-state method. Under 450 nm excitation, the as-prepared samples simultaneously exhibit blue emission (P-3(0) -> H-3(4)), green emission (P-3(1 )-> H-3(4)) and red emission (D-1(2) -> H-3(4), P-3(0) -> F- 3(2)) of Pr3+. They present different dependence on the temperature due to the intervalence charge transfer state (IVCT). Accordingly, the four FIR models between P-3(1 )-> H-3(4) and P-3(0 )-> H-3(4) (G/B), P-3(1 )-> H-3(4) and P-3(0) -> F-3(2) (G/R2), D-1(2) -> H-3(4) and P-3(0) -> H-3(4) (R1/B) and D-1(2) -> H-3(4) and P-3(0) -> F- 3(2) (R1/R2) are used as temperature detecting signal in the range of 298-523 K, and the maximum absolute and relative sensitivity of LaMg0.402Nb0.598O3: 1.2% Pr3+ sample reached 0.0597K(-1) at 523 K and 0.7250% K-1 at 473 K, respectively. Excellent temperature sensing features are also demonstrated in the LaMg0.402Nb0.598O3: 0.3% Pr3+ and LaMg0.402Nb0.598O3: 2.0% Pr3+ samples. Except for high sensitivity for temperature sensing, the designed Pr3+-doped double-perovskite materials also realize the self-calibration by simultaneous monitoring of four models of FIR. Moreover, after five cycles, the relative luminescence intensity of LaMg0.402Nb0.598O3: 1.2% Pr3+ sample remains stable. These results indicate that LaMg0.402Nb0.598O3: Pr3+ phosphors have great promising application as self-calibrated optical temperature sensors.

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第 49 条，共 321 条

标题: Nanoscale pore structure and mechanical property analysis of coal: An insight combining AFM and SEM images

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摘要: Scanning Electron Microscopy (SEM) and Atomic Force Microscope (AFM), two easily acquired and widely applied image acquisition and analysis methods, have rarely been combined to study the pore structure for unconventional natural gas reservoir rocks. In this work, we present an investigation of nanoscale detection of the pore distribution and mechanical properties of coals using SEM and AFM observations, and conduct quantitative analyses on pore structure distribution, surface roughness and mechanical properties. The morphological characteristics of the coal surface can be revealed by both SEM and AFM methods, and the mechanical parameters of the selected position were obtained under the peakforce quantitative nano-mechanics (PF-QNM) AFM mode, including the Young's modulus, peak force error, deformation, and adhesion forces. By fusing 800 high resolution SEM images into one single image (named as MAPS), the pores morphology and distribution of different scales were acquired. And the studied coal shows different types of cellular pores and gas pores with multiresolution. The mechanical property difference between the matrix and minerals of coal are clearly observed, with the Young's modulus of organic component around 2 GPa, and that of the minerals generally higher than 10 GPa. The maximum adhesion force values range between 20 and 50 nN. The high values occurred where pores are developed. This work demonstrated that the combination of two dimensional (2D) SEM and three dimensional (3D) AFM results is effective in detection of surface properties, and is of significance in revealing the pore structure and mechanical properties at nanoscale.

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第 50 条，共 321 条

标题: Bi4NbO8Cl {001} nanosheets coupled with g-C3N4 as 2D/2D heterojunction for photocatalytic degradation and CO2 reduction

作者: Xu, Y (Xu, Yue); You, Y (You, Yong); Huang, HW (Huang, Hongwei); Guo, YX (Guo, Yuxi); Zhang, YH (Zhang, Yihe)

来源出版物: JOURNAL OF HAZARDOUS MATERIALS 卷: 381 文献号: 121159 DOI: 10.1016/j.jhazmat.2019.121159 出版年: JAN 5 2020

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摘要: Photocatalytic activity is largely restricted by insufficient photoabsorption and intense recombination between charge carriers. Here, we first synthesized Bi4NbO8Cl nanosheets with {001} exposing facets by a molten-salt growth method, which shows largely promoted photocatalytic performance for the degradation of tetracycline (TC) and bisphenol A (BPA) in comparison with Bi4NbO8Cl particles obtained by solid-state reaction. The 2D/2D Bi4NbO8Cl/g-C3N4 heterojunction photocatalysts were then fabricated via high-energy ball-milling and post-sintering to realize intimate interfacial interaction. The photocatalytic activity of all the Bi4NbO8Cl/g-C3N4 composites largely enhances compared to Bi4NbO8Cl nanosheets and g-C3N4, also far exceeding the mechanically-mixed Bi4NbO8Cl nanosheets and g-C3N4. The impact of different reaction parameters on the photocatalytic degradation activities was investigated, including catalyst concentration, pH value and TC concentration. In addition, Bi4NbO8Cl/g-C3N4 also presents improved photocatalytic CO2 reduction activity for CO production. The large enhancement on photocatalytic activity of Bi4NbO8Cl/g-C3N4 composites is owing to the synergistic effect of favorable 2D/2D structure and construction of type II heterojunction with intimate interfacial interaction, thus boosting the charge separation. The formation of type II heterojunction was evidenced by selective photo-deposition of Pt and MnOx, which demonstrate that the reductive sites and oxidative sites are on Bi4NbO8Cl nanosheets and g-C3N4, respectively. This work may provide some insights into fabrication of efficient visible-light driven photocatalysts for environmental and energy applications.

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第 51 条，共 321 条

标题: Plate Tectonics and the Archean Earth

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编者: Jeanloz R; Freeman KH

来源出版物: ANNUAL REVIEW OF EARTH AND PLANETARY SCIENCES, VOL 48, 2020 丛书: Annual Review of Earth and Planetary Sciences 卷: 48 页: 291-320 DOI: 10.1146/annurev-earth-081619-052705 出版年: 2020

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摘要: If we accept that a critical condition for plate tectonics is the creation and maintenance of a global network of narrow boundaries separating multiple plates, then to argue for plate tectonics during the Archean requires more than a local record of subduction. A case is made for plate tectonics back to the early Paleoproterozoic, when a cycle of breakup and collision led to formation of the supercontinent Columbia, and bimodal metamorphism is registered globally. Before this, less preserved crust and survivorship bias become greater concerns, and the geological record may yield only a lower limit on the emergence of plate tectonics. Higher mantle temperature in the Archean precluded or limited stable subduction, requiring a transition to plate tectonics from another tectonic mode. This transition is recorded by changes in geochemical proxies and interpreted based on numerical modeling. Improved understanding of the secular evolution of temperature and water in the mantle is a key target for future research.

Higher mantle temperature in the Archean precluded or limited stable subduction, requiring a transition to plate tectonics from another tectonic mode.

Plate tectonics can be demonstrated on Earth since the early Paleoproterozoic (since c. 2.2 Ga), but before the Proterozoic Earth's tectonic mode remains ambiguous.

The Mesoarchean to early Paleoproterozoic (3.2-2.3 Ga) represents a period of transition from an early tectonic mode (stagnant or sluggish lid) to plate tectonics.

The development of a global network of narrow boundaries separating multiple plates could have been kick-started by plume-induced subduction.

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第 52 条，共 321 条

标题: Channel-Attention-Based DenseNet Network for Remote Sensing Image Scene Classification

作者: Tong, W (Tong, Wei); Chen, WT (Chen, Weitao); Han, W (Han, Wei); Li, XJ (Li, Xianju); Wang, LZ (Wang, Lizhe)

来源出版物: IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING 卷: 13 页: 4121-4132 DOI: 10.1109/JSTARS.2020.3009352 出版年: 2020

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摘要: Remote sensing image scene classification has been widely applied and has attracted increasing attention. Recently, convolutional neural networks (CNNs) have achieved remarkable results in scene classification. However, scene images have complex semantic relationships between multiscale ground objects, and the traditional stacked network structure lacks the ability to effectively extract multiscale and key features, resulting in limited feature representation capabilities. By simulating the way that humans understand and perceive images, attention mechanisms can be beneficial for quickly and accurately acquiring key features. In our study, we propose a channel-attention-based DenseNet (CAD) network for scene classification. First, the lightweight DenseNet121 is selected as the backbone for the spatial relationship between multiscale ground objects. In the spatial domain, densely connected CNN layers can extract spatial features at multiple scales and correlate with each other. Second, in the channel domain, a channel attention mechanism is introduced to strengthen the weights of the important feature channels adaptively and to suppress the secondary feature channels. Third, the cross-entropy loss function based on label smoothing is used to reduce the impact of interclass similarity upon feature representations. The proposed CAD network is evaluated on three public datasets. The experimental results demonstrate that the CAD network can achieve performance comparable to those of other state-of-the-art methods. The visualization through the Grad-CAM ++ algorithm also reflects the effectiveness of channel attention and the powerful feature representation capabilities of the CAD network.

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第 53 条，共 321 条

标题: A fractional-order hyper-chaotic economic system with transient chaos

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来源出版物: CHAOS SOLITONS & FRACTALS 卷: 130 文献号: 109400 DOI: 10.1016/j.chaos.2019.109400 出版年: JAN 2020

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摘要: We introduce for the first time a fractional-order hyperchaotic economic system. In this system, chaos generation depends upon the value of fractional-order. For certain fractional orders, a sustained regime of chaos is obtained. Also, the transient chaos phenomenon is detected for lower fractional orders. The dynamical behavior of the system is numerically investigated using bifurcations diagrams, basins of attraction, and Lyapunov exponents. Next, an adaptive terminal sliding mode control (ATSMC) with neural network estimator for finite-time stabilization and synchronization of the fractional-order system has been proposed. The radial basis function (RBF) neural network is used to achieve the estimation of the unknown function of the system. Also, the effects of external disturbances are fully taken into account with neural network estimator. The weights of the RBF neural network are updated based on the appropriate adaptation law. Using the fractional version of the Lyapunov stability theorem, the finite-time convergence of the closed-loop system has been proven. Finally, the new control technique is used for control and synchronization of the fractional-order hyperchaotic economic system. Simulation results illustrate the effectiveness of the proposed control scheme for uncertain fractional-order systems in the presence of external disturbances. (C) 2019 Elsevier Ltd. All rights reserved.

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第 54 条，共 321 条

标题: SO-CNN based urban functional zone fine division with VHR remote sensing image

作者: Zhou, W (Zhou, Wen); Ming, DP (Ming, Dongping); Lv, XW (Lv, Xianwei); Zhou, KQ (Zhou, Keqi); Bao, HQ (Bao, Hanqing); Hong, ZL (Hong, Zhaoli)

来源出版物: REMOTE SENSING OF ENVIRONMENT 卷: 236 文献号: 111458 DOI: 10.1016/j.rse.2019.111458 出版年: JAN 2020

Web of Science 核心合集中的 "被引频次": 84

被引频次合计: 87

摘要: Functional zone reflects city's spatial structures, and as a carrier of social and economic activities, it is of critical significance to urban management, resource allocation and planning. However, most researches on functional zone division are based on a large spatial scale such as blocks or other scales larger than it. Aiming at a subtle fine functional result, the concept of Super Object (SO) was especially explained, also a Super Object - Convolutional Neural Network (SO-CNN) based urban functional zone fine division method with very high resolution (VHR) remote sensing image was proposed. The original image was firstly segmented into different SOs which correspond to the basic functional zone units in geography. A random point generation algorithm was used to generate the voting points for functional zone category identification, and then a trained CNN model was employed to assign functional attributes to those voting points. Then a statistical method was involved to count the frequency of the classified voting points of different functional attributes in each basic functional zone units. By voting process, the functional attribute with the highest frequency was assigned to the basic functional zone unit, which corrected the misclassification results of CNN to some extent. This paper also explored the scale effect of the SO on the final functional zone classification result from two aspects, spatial scale of SO and the sampling window size of CNN model. Because of the natural differences between functional zone division and land cover classification, region based overall accuracy assessment method was used to evaluate functional zone division result. Compared with other methods, SO-CNN method can generate higher accuracy and subtle result, based on which larger spatial scale results can be available by scaling-up, so SO-CNN method plays a great significant role on small scale functional space structure research.

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第 55 条，共 321 条

标题: Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey

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来源出版物: INTERNATIONAL JOURNAL OF BIOLOGICAL SCIENCES 卷: 16 期: 10 页: 1745-1752 DOI: 10.7150/ijbs.45221 出版年: 2020

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摘要: Unprecedented measures have been adopted to control the rapid spread of the ongoing COVID-19 epidemic in China. People's adherence to control measures is affected by their knowledge, attitudes, and practices (KAP) towards COVID-19. In this study, we investigated Chinese residents' KAP towards COVID-19 during the rapid rise period of the outbreak. An online sample of Chinese residents was successfully recruited via the authors' networks with residents and popular media in Hubei, China. A self-developed online KAP questionnaire was completed by the participants. The knowledge questionnaire consisted of 12 questions regarding the clinical characteristics and prevention of COVID-19. Assessments on residents' attitudes and practices towards COVID-19 included questions on confidence in winning the battle against COVID-19 and wearing masks when going out in recent days. Among the survey completers (n=6910), 65.7% were women, 63.5% held a bachelor degree or above, and 56.2% engaged in mental labor. The overall correct rate of the knowledge questionnaire was 90%. The majority of the respondents (97.1%) had confidence that China can win the battle against COVID-19. Nearly all of the participants (98.0%) wore masks when going out in recent days. In multiple logistic regression analyses, the COVID-19 knowledge score (OR: 0.75-0.90, P<0.001) was significantly associated with a lower likelihood of negative attitudes and preventive practices towards COVID-2019. Most Chinese residents of a relatively high socioeconomic status, in particular women, are knowledgeable about COVID-19, hold optimistic attitudes, and have appropriate practices towards COVID-19. Health education programs aimed at improving COVID-19 knowledge are helpful for Chinese residents to hold optimistic attitudes and maintain appropriate practices. Due to the limited sample representativeness, we must be cautious when generalizing these findings to populations of a low socioeconomic status.

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第 56 条，共 321 条

标题: Ancient deep roots for Mesozoic world-class gold deposits in the north China craton: An integrated genetic perspective

作者: Yang, CX (Yang, Cheng-Xue); Santosh, M (Santosh, M.)

来源出版物: GEOSCIENCE FRONTIERS 卷: 11 期: 1 页: 203-214 DOI: 10.1016/j.gsf.2019.03.002 出版年: JAN 2020

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摘要: The North China Craton (NCC) hosts some of the world-class gold deposits that formed more than 2 billion years after the major orogenic cycles and cratonization. The diverse models for the genesis of these deposits remain equivocal, and mostly focused on the craton margin examples, although synchronous deposits formed in the interior domains. Here we adopt an integrated geological and geophysical perspective to evaluate the possible factors that contributed to the formation of the major gold deposits in the NCC. In the Archean tectonic framework of the NCC, the locations of the major gold deposits fall within or adjacent to greenstone belts or the margins of micro-continents. In the Paleoproterozoic framework, they are markedly aligned along two major collisional sutures - the Trans North China Orogen and the Jiao-Liao-Ji Belt. Since the Mesozoic intrusions hosting these deposits do not carry adequate signals for the source of gold, we explore the deep roots based on available geophysical data. We show that the gold deposits are preferentially distributed above zones of uplifted MOHO and shallow LAB corresponding to thinned crust and eroded sub-lithospheric mantle, and that the mineralization is located above regions of high heat flow representing mantle upwelling. The NCC was at the center of a multi-convergent regime during the Mesozoic which intensely churned the mantle and significantly enriched it. The geophysical data on Moho and LAB upwarp from the centre towards east of the craton is more consistent with paleo-Pacific slab subduction from the east exerting the dominant control on lithospheric thinning. Based on these results, and together with an evaluation of the geochemical and isotopic features of the Mesozoic magmatic intrusions hosting the gold mineralization, we propose a genetic model that invokes reworking of ancient Au archives preserved in the lower crust and metasomatised upper mantle and which were generated through multiple subduction, underplating and cumulation events associated with cratonization of the NCC as well as the subduction-collision of Yangtze Craton with the NCC. The heat and material input along zones of heterogeneously thinned lithosphere from a rising turbulent mantle triggered by Mesozoic convergent margins surrounding the craton aided in reworking the deep roots of the ancient Au reservoirs, leading to the major gold metallogeny along craton margins as well as in the interior of the NCC. (C) 2019, China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V.

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第 57 条，共 321 条

标题: Sulfur-based mixotrophic bio-reduction for efficient removal of chromium (VI) in groundwater

作者: Zhang, BG (Zhang, Baogang); Wang, ZL (Wang, Zhongli); Shi, JX (Shi, Jiaxin); Dong, HL (Dong, Hailiang)

来源出版物: GEOCHIMICA ET COSMOCHIMICA ACTA 卷: 268 页: 296-309 DOI: 10.1016/j.gca.2019.10.011 出版年: JAN 1 2020

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摘要: Organic matter and reduced sulfur compounds commonly coexist in groundwater aquifers and their respective roles in Cr (VI) bio-reduction have been well established, but Cr(VI) bio-reduction under mixotrophic condition, where organics and elemental sulfur simultaneously occur as co-donors of electrons, remains largely unknown. Herein a sulfur-based mixotrophic bio-reduction process is demonstrated to be effective to detoxify Cr(VI), with a removal efficiency of 95.5 +/- 0.74% within 48 h at an initial concentration of 50 mg/L. In addition to direct reduction by heterotrophic Cr(VI) reducers such as Desulfovibrio and Desulfuromonas, volatile fatty acids (VFAs) produced from autotrophic sulfur oxidation served as electron donors for heterotrophic Cr(VI) reducers. Part of VFAs was also assimilated and accumulated as glycogen within cells, which enhanced their Cr(VI) removal capacity. Metabolic pathway analysis suggested that Cr(VI) was reduced to insoluble Cr(III) both extracellularly by cytochrome c and intracellularly by nicotinamide adenine dinucleotide in the presence of upregulated chrA gene. Constituents of extracellular polymeric substances (EPS) also contributed to Cr(VI) reduction enzymatically, through binding of toxic Cr(VI) by carboxyl and hydroxyl groups. Results from this study have important implications for understanding the biogeochemical behavior and environmental remediation of Cr(VI) in groundwater aquifers and sediments/soils. (C) 2019 Elsevier Ltd. All rights reserved.

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标题: Distinguishing the impacts of climate change and anthropogenic factors on vegetation dynamics in the Yangtze River Basin, China

作者: Qu, S (Qu, Sai); Wang, LC (Wang, Lunche); Lin, AW (Lin, Aiwen); Yu, DQ (Yu, Deqing); Yuan, MX (Yuan, Moxi); Li, CA (Li, Chang'an)

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摘要: Assessing and attributing vegetation dynamics can provide essential information for environmental resources management, particularly for those regions with fragile ecosystems. The Yangtze River Basin (YRB), a region of pivotal importance to the ecological balance and security of China, has experienced dramatic changes in environment and landscape driven by climate change and human activities, especially afforestation projects in recent years. vet how the driving factors contribute quantitatively to vegetation dynamics is not well established. Here we investigate spatiotemporal variability of vegetation coverage in terms of the Enhanced Vegetation Index (EVI) over 2001-2015, and analyze the actual influences of various climatic factors on EVI inter-annual variations. Further analysis quantifies the contributions of climate change and anthropogenic factors to EVI inter-annual variations. The results show that over the 15-year period, the average EVI demonstrated fluctuations but denoted a generally upward trend, with an increasing rate of 0.0027/a. According to the Hurst exponent analysis, areas with consistent improvement were primarily concentrated in Hunan Province and eastern Sichuan Province, where the main vegetation types are broadleaf forest and mixed forest. The average contributions of temperature, precipitation and solar radiation to EVI inter-annual variations in the YRB was 0.0041/a, 0.00012/a, and - 0.0034/a, respectively. Temperature was the controlling climate factor, with the greatest contribution to EVI inter-annual variations, while solar radiation made strong negative contributions. The average contributions of climate change and anthropogenic factors to EVI inter-annual variations were 0.0008/a and 0.0019/a, accounting for 70.37% and 29.63% of the total EVI changes respectively. Human activities, especially ecological afforestation projects, were the main driving factors improving vegetation coverage in the YRB, and the spatial distribution of forest gains was consistent with the positive contribution of human activities to the EVI trend. However, urbanization has occupied the growth space of vegetation and was a negative human-induced factor affecting vegetation growth.

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输出日期: 2023-09-04

第 59 条，共 321 条

标题: Infrared and visible image fusion based on target-enhanced multiscale transform decomposition

作者: Chen, J (Chen, Jun); Li, XJ (Li, Xuejiao); Luo, LB (Luo, Linbo); Mei, XG (Mei, Xiaoguang); Ma, JY (Ma, Jiayi)

来源出版物: INFORMATION SCIENCES 卷: 508 页: 64-78 DOI: 10.1016/j.ins.2019.08.066 出版年: JAN 2020

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摘要: In this study, we propose a target-enhanced multiscale transform (MST) decomposition model for infrared and visible image fusion to simultaneously enhance the thermal target in infrared images and preserve the texture details in visible images. The Laplacian pyramid is initially used to separately decompose two pre-registered source images into low- and high-frequency bands. The common "max-absolute" fusion rule is performed for fusion for high-frequency bands. We use the decomposed infrared low-frequency information to determine the fusion weight of low-frequency bands and highlight the target. Meanwhile, a regularization parameter is introduced to dominate the proportion of the infrared features in a gentle manner, which can be further adjusted according to user requirements. Finally, we use inverse transform with the Laplacian pyramid (LP) to reconstruct the fused image. Qualitative and quantitative experimental results on publicly available datasets demonstrate that the proposed method can generate fused images with clearly highlighted targets and abundant details. These images exhibit better visual effects and objective metric values than those of five other commonly used MST decomposition methods. (C) 2019 Elsevier Inc. All rights reserved.

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第 60 条，共 321 条

标题: Coupling Piezocatalysis and Photocatalysis in Bi4NbO8X (X = Cl, Br) Polar Single Crystals

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来源出版物: ADVANCED FUNCTIONAL MATERIALS 卷: 30 期: 7 文献号: 1908168 DOI: 10.1002/adfm.201908168 提前访问日期: DEC 2019 出版年: FEB 12 2020

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摘要: Reactive oxygen species (ROS) as green oxidants are of great importance for environmental and biological applications. Photocatalysis is one of the major routes for ROS evolution, which is seriously restricted by rapid charge recombination. Herein, piezocatalysis and photocatalysis (i.e., piezo-photocatalysis) are coupled to efficiently produce superoxide radicals (center dot O-2(-)), hydrogen peroxide (H2O2), and hydroxyl radicals (center dot OH) via oxygen reduction reaction (ORR), by using Bi4NbO8X (X = Cl, Br) single crystalline nanoplates. Significantly, the piezo-photocatalytic process leads to the highest ORR performance of the Bi4NbO8Br nanoplates, exhibiting center dot O-2(-), H2O2, and center dot OH evolution rates of 98.7, 792, and 33.2 mu mol g(-1) h(-1), respectively. The formation of a polarized electric field and band bending allows directional separation of charge carriers, promoting the catalytic activity. Furthermore, the reductive active sites are found enriched on all the facets in the piezo-photocatalytic process, also contributing to the ORR. By piezo-photodeposition of Pt to artificially plant reductive reactive sites, the Bi4NbO8Br plates demonstrate largely enhanced photocatalytic H-2 production activity with a rate of 203.7 mu mol g(-1) h(-1). The present work advances piezo-photocatalysis as a new route for ROS generation, but also discloses the potential of piezo-photocatalytic active sites enriching for H-2 evolution.

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第 61 条，共 321 条

标题: Efficient degradation of atrazine with porous sulfurized Fe2O3 as catalyst for peroxymonosulfate activation

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来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 259 文献号: 118056 DOI: 10.1016/j.apcatb.2019.118056 出版年: DEC 15 2019

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摘要: In this study, magnetic porous sulfurized Fe2O3 (PS-Fe2O3 ) composites were prepared through the co-precipitation method and were applied to activate peroxymonosulfate (PMS) for the degradation of emerging contaminants. Characterization results indicated that PS-Fe2O3 catalyst with uniform elemental distribution possessed a large number of micro- and meso- pores. When the molar ratio of FeSO4:S2O32- was 2:1 during the synthesis process, the PS-Fe2O3-2 exhibited the best performance on PMS activation for atrazine (ATZ) removal. The catalytic activity of PS-Fe2O3 catalysts was enhanced with increased sulfurization extent. The effects of catalyst dosage, PMS concentration, pH, and water impurities (i.e. Cl-, HCO3-, NO3- and humic acid) on ATZ degradation were investigated. Both sulfate radicals and hydroxyl radicals were detected in the PS-Fe2O3 -2/PMS system, and sulfate radicals played the predominant role for the degradation of ATZ. The cycle of (math)Fe(II)/(math)Fe (III) and surface-bonded hydroxyl group both contributed to the PMS activation, and the reduction of Fe3+ to Fe2+ was significantly accelerated by the low-valent sulfur species (such as (math)sulfite) on the catalyst surface. The transformation products of ATZ in PS-Fe2O3-2/PMS system were monitored on LC/MS, which were probably generated through lateral chain oxidation and dechlorination-hydroxylation. Overall, PS-Fe2O3 has potential to be a feasible catalyst for the removal of organic pollutants from water.

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第 62 条，共 321 条

标题: Comprehensive utilization and environmental risks of coal gangue: A review

作者: Li, JY (Li, Jiayan); Wang, JM (Wang, Jinman)

来源出版物: JOURNAL OF CLEANER PRODUCTION 卷: 239 文献号: 117946 DOI: 10.1016/j.jclepro.2019.117946 出版年: DEC 1 2019

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摘要: The amount of coal gangue, a by-product of coal mining and washing, is rapidly increasing with the growing trend of energy consumption. The accumulated coal gangue without appropriate utilization has resulted in a squander of resources, waste disposal and environmental pollution issues. Over the past few decades, there has been wide attention in developing strategies for the utilization of coal gangue due to a cultural shift towards sustainable development coupled with increasing demand for disposing the challenge of coal gangue accumulation. However, to our knowledge, there is no thorough and in-depth review on the series address of coal gangue reuse. In spite of some advantages of using coal gangue, it is notable that negative environmental problems cannot be ignored, so the scientific utilization is necessary to control the environmental impacts. Therefore, the main objective of this paper is to provide a comprehensive literature review of coal gangue utilization in building material production, energy generation, soil improvement and other high-added applications, analyze the worldwide dynamics of the studies on coal gangue utilization and identify the potential environmental risks in various pathways. The key focus of the review is on detecting the potential problems and thus giving recommendations for the solution. In addition, based on the progress of previous research, this paper also points the directions for further research within the field. A bibliometric analysis was developed in China National Knowledge Internet and Web of Science and a systematic review was conducted for related 237 articles to understand the physicochemical properties and utilization characteristics of coal gangue as well as corresponding environmental risks. The results indicated that the number of published articles has increased in recent years, and the researches were mainly from China, with the contribution of 78.94% of the total selected publications. Besides, these researches mainly focused on the utilization of coal gangue, while there was a lack of attention to environmental risks. The findings of the present study open up a new gate for the further application in coal gangue, hopefully motivate future relevant studies and guide the policy-making. (C) 2019 Elsevier Ltd. All rights reserved.

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第 63 条，共 321 条

标题: Facile preparation of porous Mn/Fe3O4 cubes as peroxymonosulfate activating catalyst for effective bisphenol A degradation

作者: Du, JK (Du, Jiangkun); Bao, JG (Bao, Jianguo); Liu, Y (Liu, Ying); Kim, SH (Kim, Sang Hoon); Dionysiou, DD (Dionysiou, Dionysios D.)

来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 376 特刊: SI 文献号: 119193 DOI: 10.1016/j.cej.2018.05.177 出版年: NOV 15 2019

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摘要: Metal oxides are potentially interesting catalysts for activating peroxymonosulfate (PMS) for the degradation of recalcitrant contaminants. This study presents a magnetic porous Mn-Fe binary oxide (p-Mn/Fe3O4) in micronsize with abundant micro- and meso- pores. This novel catalyst exhibited high efficacy and long-term stability in activating PMS for degradation of bisphenol A (BPA). Sulfate radicals and hydroxyl radicals were identified from catalytic PMS activation according to electron paramagnetic resonance (EPR) characterization. The effects of Fe/Mn ratio, catalyst dose, initial pH and temperature were investigated. Compared to monometallic oxides, p-Mn/Fe3O4 exhibited a better catalytic performance because of the significant synergy between Mn and Fe species. Several BPA intermediates were identified. On the basis of bio-toxicity assay and TOC measurements, BPA transformed to some toxic intermediates during the initial reaction stage, and then decomposed efficiently to low toxicity products and mineralized to carbon dioxide and water molecules. This study shows that p-Mn/Fe3O4 is an efficient and environmentally benign catalyst for PMS oxidation of organic pollutants.

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第 64 条，共 321 条

标题: Short and mid-term sea surface temperature prediction using time-series satellite data and LSTM-AdaBoost combination approach

作者: Xiao, CJ (Xiao, Changjiang); Chen, NC (Chen, Nengcheng); Hu, CL (Hu, Chuli); Wang, K (Wang, Ke); Gong, JY (Gong, Jianya); Chen, ZQ (Chen, Zeqiang)

来源出版物: REMOTE SENSING OF ENVIRONMENT 卷: 233 文献号: 111358 DOI: 10.1016/j.rse.2019.111358 出版年: NOV 2019

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摘要: Sea surface temperature (SST) is one of the most important parameters in the global ocean-atmospheric system, changes of which can have profound effects on the global climate and may lead to extreme weather events such as droughts and floods. Therefore, predicting the dynamics of future SSTs is of vital importance which can help identify these extreme events and alleviate the losses they cause. In this paper, a machine learning method combining the long short-term memory (LSTM) deep recurrent neural network model and the AdaBoost ensemble learning model (LSTM-AdaBoost) is proposed to predict the short and mid-term daily SST considering that LSTM is good at modelling long-term dependencies but suffers from overfitting, while AdaBoost has strong prediction capability and is not easily overfitted. By combining these two strong and heterogeneous models, the prediction errors related to variance may cancel out each other and the final results can be improved. In this method, the historical time-series satellite data of SST anomaly (SSTA) is used instead of SST itself considering that the fluctuations of SSTs are very small compared to their absolute magnitudes. The seasonality of the SSTA time series is first modelled using polynomial regression and then removed. Then, the deseasonalized time series are used to train the developed LSTM model and AdaBoost model independently. Daily SSTA predictions are made using these two models, and eventually, their predictions are combined as final predictions using the averaging strategy. A case study in the East China Sea that predicts the daily SSTA 10?days ahead shows that the proposed LSTM-AdaBoost combination model outperforms the LSTM and AdaBoost separately, as well as the optimized support vector regression (SVR) model, the optimized feedforward backpropagation neural network model (BPNN), and the stacking LSTM-AdaBoost model (S\_LSTM-AdaBoost), when judged using multiple error statistics and from different perspectives. The results suggest that the LSTM-AdaBoost combination model using the averaging strategy is highly promising for short and mid-term daily SST predictions.

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第 65 条，共 321 条

标题: Geohazards in the three Gorges Reservoir Area, China Lessons learned from decades of research

作者: Tang, HM (Tang, Huiming); Wasowski, J (Wasowski, Janusz); Juang, CH (Juang, C. Hsein)

来源出版物: ENGINEERING GEOLOGY 卷: 261 文献号: 105267 DOI: 10.1016/j.enggeo.2019.105267 出版年: NOV 1 2019

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摘要: The impoundment of the 660-km long reservoir behind the huge Three Gorges Dam, the world's largest hydropower station, increased regional seismicity and reactivated severe geohazards. Before the reservoir filling was initiated in 2003, the region had approximately two earthquakes per year with magnitudes between 3.0 and 4.9; after the full impoundment in 2008, approximately 14 earthquakes per year occurred with magnitudes between 3.0 and 5.4. In addition, hundreds of landslides were reactivated and are now in a state of intermittent creep. Many landslides exhibit step-like annual pattern of displacement in response to quasi-regular variations in seasonal rainfall and reservoir level. Additional problems include rock avalanches, impulse waves and debris flows. The seriousness of these events motivated numerous studies that resulted in 1) Better insight into the behavior and evolution mechanism of geohazards in the Three Gorges Reservoir Area (TGRA); 2) Implementation of monitoring and early-warning systems of geohazards; and 3) Design and construction of preventive countermeasures including lattice anchors, stabilizing piles, rock bolts, drainage canals and tunnels, and huge revetments. This paper reviews the hydro-geologic setting of TGRA geohazards, examines their occurrence and evolution in the past few decades, offers insight learned from extensive research on TGRA geohazards, and suggests topics for future research to address the remaining challenges.

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第 66 条，共 321 条

标题: Remobilization of metasomatized mantle lithosphere: a new model for the Jiaodong gold province, eastern China

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来源出版物: MINERALIUM DEPOSITA 卷: 55 期: 2 特刊: SI 页: 257-274 DOI: 10.1007/s00126-019-00925-0 提前访问日期: OCT 2019 出版年: FEB 2020

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摘要: The 1 20 Ma Jiaodong province in the North China Craton, composed of abundant Mesozoic granites that intrude Precambrian metamorphic basement, is bordered by the Sulu orogenic belt, which formed through the collision between the North China and Yangtze cratons in the Triassic. Insights on the geodynamic setting and source of gold and fluids in the Jiaodong gold province are based on a detailed study of the Sanshandao deposit. The delta C-13(PDB) and delta O-18 values of hydrothermal calcite from this deposit range from - 4.3 to - 6.5 parts per thousand and 11.4 to 15.1 parts per thousand, respectively, which are compatible with a mantle source. Pre-ore mafic dykes in the deposit show typical arc-like geochemical features, suggesting that the mantle source was metasomatized prior to the basic magmatism. The delta S-34 values of gold-related pyrite from Sanshandao and other large deposits in the province range from 10.9 to 11.5 parts per thousand and are higher than those of the country rocks, but consistent with the signature of orogenic gold deposits sourced from a Neoproterozoic sedimentary reservoir. These high positive delta S-34 values are interpreted to be inherited from auriferous Neoproterozoic sedimentary rocks of the northern Yangtze Craton, which were subducted into the mantle lithosphere beneath the North China Craton during the formation of eclogite in the adjacent Sulu orogenic belt in the Triassic. The syn-ore Lower Cretaceous mafic dykes display oceanic island basalt-like geochemical features, suggesting that asthenosphere upwelling triggered the release of gold and sulfur from an enriched and fertilized mantle lithosphere, contributing to the auriferous fluid which formed the widespread gold mineralization in the Jiaodong province at ca. 120 Ma.

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标题: Late Fusion Incomplete Multi-View Clustering

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摘要: Incomplete multi-view clustering optimally integrates a group of pre-specified incomplete views to improve clustering performance. Among various excellent solutions, multiple kernel k-means with incomplete kernels forms a benchmark, which redefines the incomplete multi-view clustering as a joint optimization problem where the imputation and clustering are alternatively performed until convergence. However, the comparatively intensive computational and storage complexities preclude it from practical applications. To address these issues, we propose Late Fusion Incomplete Multi-view Clustering (LF-IMVC) which effectively and efficiently integrates the incomplete clustering matrices generated by incomplete views. Specifically, our algorithm jointly learns a consensus clustering matrix, imputes each incomplete base matrix, and optimizes the corresponding permutation matrices. We develop a three-step iterative algorithm to solve the resultant optimization problem with linear computational complexity and theoretically prove its convergence. Further, we conduct comprehensive experiments to study the proposed LF-IMVC in terms of clustering accuracy, running time, advantages of late fusion multi-view clustering, evolution of the learned consensus clustering matrix, parameter sensitivity and convergence. As indicated, our algorithm significantly and consistently outperforms some state-of-the-art algorithms with much less running time and memory.

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第 68 条，共 321 条

标题: Flood susceptibility mapping in Dingnan County (China) using adaptive neuro-fuzzy inference system with biogeography based optimization and imperialistic competitive algorithm

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摘要: Flooding is one of the most significant environmental challenges and can easily cause fatal incidents and economic losses. Flood reduction is costly and time-consuming task; so it is necessary to accurately detect flood susceptible areas. This work presents an effective flood susceptibility mapping framework by involving an adaptive neuro-fuzzy inference system (ANFIS) with two metaheuristic methods of biogeography based optimization (BBO) and imperialistic competitive algorithm (ICA). A total of 13 flood influencing factors, including slope, altitude, aspect, curvature, topographic wetness index, stream power index, sediment transport index, distance to river, landuse, normalized difference vegetation index, lithology, rainfall and soil type, were used in the proposed framework for spatial modeling and Dingnan County in China was selected for the application of the proposed methods due to data availability. There are 115 flood occurrences in the study area which were randomly separated into training (70% of the total) and verification (30%) sets. To perform the proposed framework, the step-wise weight assessment ratio analysis algorithm is first used to evaluate the correlation between influencing factors and floods. Then, two ensemble methods of ANFIS-BBO and ANFIS-ICA are constructed for spatial prediction and producing flood susceptibility maps. Finally, these resultant maps are assessed in terms of several statistical and error measures, including receiver operating characteristic (ROC) curve and area under the ROC curve (AUC), root-mean-square error (RMSE). The experimental results demonstrated that the two ensemble methods were more effective than ANFIS in the study area. For instance, the predictive AUC values of 0.8407, 0.9045 and 0.9044 were achieved by the methods of ANFIS, ANFIS-BBO and ANFIS-ICA, respectively. Moreover, the RMSE values for ANFIS, ANFIS-BBO and ANFIS-ICA using the verification set were 0.3100, 0.2730 and 0.2700, respectively. In addition, as regards ANFIS-BBO and ANFIS-ICA, a total areas of 39.30% and 35.39% were classified as highly susceptible to flooding. Therefore, the proposed ensemble framework can be used for flood susceptibility mapping in other sites with similar geo-environmental characteristics for taking measures to manage and prevent flood damages.

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第 69 条，共 321 条

标题: Can low-carbon city construction facilitate green growth? Evidence from China's pilot low-carbon city initiative

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来源出版物: JOURNAL OF CLEANER PRODUCTION 卷: 231 页: 1158-1170 DOI: 10.1016/j.jclepro.2019.05.327 出版年: SEP 10 2019

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摘要: Faced with the predicament of sustainable development in traditional cities, the low-carbon city, as a novel urban development mode, provides a feasible idea for resolving the tensions among urban development, resource conservation and environmental protection. Using prefecture-level panel data during 2007-2016, we adopt the difference-in-differences model to explore the impact of low-carbon city construction on green growth. Afterward, we estimate the heterogeneity of economic environmental effects on cities, and those effects are attributed to different scales and locations. The robustness tests reveal that low-carbon pilot cities significantly and continuously benefit in terms of the green total factor productivity through technical effects being partly transformed into green technical progress and structural effects. Additionally, the construction of low-carbon cities has scale economy and regional differences. Cities with larger scales, more complete infrastructure and better foundations for technology have more significantly positive effects on green growth. These findings also apply to cities in similar developing countries seeking to achieve economic transformation and green growth. (C) 2019 Elsevier Ltd. All rights reserved.

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第 70 条，共 321 条

标题: Municipal solid waste (MSW) incineration fly ash as an important source of heavy metal pollution in China

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来源出版物: ENVIRONMENTAL POLLUTION 卷: 252 页: 461-475 DOI: 10.1016/j.envpol.2019.04.082 子辑: A 出版年: SEP 2019

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摘要: Incineration has overtaken landfilling as the most important option for disposal of the increasing volumes of municipal solid waste (MSW) generated in China. Accordingly, disposal of the incineration fly ash, which is enriched with a range of heavy metals, has become a key challenge for the industry. This review analyzes the temporal and spatial trends in the distributions of As, Cd, Cr, Cu, Ni, Pb, Zn, and Hg in MSW incineration fly ash between 2003 and 2017, and estimates the inventories of heavy metals associated with the fly ash and the average levels of heavy metals in Chinese MSW based on their mass flow during MSW incineration. It was estimated that MSW incinerators in China released approximately 1.12 x 10(2), 2.96 x 10(3), 1.82 x 10(2), 3.64 x 10(4), 1.00 x 10(2), 7.32 x 10(3), 2.42 x 10(2), and 1.47 x 10(1) tonnes of Cd, Pb, Cr, Zn, Ni, Cu, As, and Hg, respectively, with the fly ash in 2016. Due to the much greater fly ash generation rate, the incinerators based on circulating fluidized bed combustor (CFBC) technology released more heavy metals during incineration of MSW compared to those based on grate furnace combustor (GFC) technology. Results of mass-flow modeling indicate that the geometric mean contents of Cd, Pb, Cr, Zn, Ni, Cu, As, and Hg in Chinese MSW were 3.0, 109, 101, 877, 34, 241, 21, and 1.7 mg/kg, respectively, which are comparable to those in the MSW from other countries. To protect the environment from the significant potential ecological risk posed by heavy metals in the mismanaged fly ash, strict regulation enforcement and compliance monitoring are necessary to reduce the heavy metal pollution brought by improper disposal of MSW incineration fly ash, and more research and development efforts on advanced technologies for stabilization of heavy metals in fly ash and its environmentally sound reuse can help mitigate its environmental risk. (C) 2019 Elsevier Ltd. All rights reserved.

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第 71 条，共 321 条

标题: Metamorphism and the evolution of plate tectonics

作者: Holder, RM (Holder, Robert M.); Viete, DR (Viete, Daniel R.); Brown, M (Brown, Michael); Johnson, TE (Johnson, Tim E.)

来源出版物: NATURE 卷: 572 期: 7769 页: 378-+ DOI: 10.1038/s41586-019-1462-2 出版年: AUG 15 2019

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摘要: Earth's mantle convection, which facilitates planetary heat loss, is manifested at the surface as present-day plate tectonics1. When plate tectonics emerged and how it has evolved through time are two of the most fundamental and challenging questions in Earth science(1-4). Metamorphic rocks-rocks that have experienced solid-state mineral transformations due to changes in pressure (P) and temperature (T)-record periods of burial, heating, exhumation and cooling that reflect the tectonic environments in which they formed(5,6). Changes in the global distribution of metamorphic (P, T) conditions in the continental crust through time might therefore reflect the secular evolution of Earth's tectonic processes. On modern Earth, convergent plate margins are characterized by metamorphic rocks that show a bimodal distribution of apparent thermal gradients (temperature change with depth; parameterized here as metamorphic T/P) in the form of paired metamorphic belts(5), which is attributed to metamorphism near (low T/P) and away from (high T/P) subduction zones(5,6). Here we show that Earth's modern plate tectonic regime has developed gradually with secular cooling of the mantle since the Neoarchaean era, 2.5 billion years ago. We evaluate the emergence of bimodal metamorphism (as a proxy for secular change in plate tectonics) using a statistical evaluation of the distributions of metamorphic T/P through time. We find that the distribution of metamorphic T/P has gradually become wider and more distinctly bimodal from the Neoarchaean era to the present day, and the average metamorphic T/P has decreased since the Palaeoproterozoic era. Our results contrast with studies that inferred an abrupt transition in tectonic style in the Neoproterozoic era (about 0.7 billion years ago(1,7,8)) or that suggested that modern plate tectonics has operated since the Palaeoproterozoic era (about two billion years ago(9-12)) at the latest.

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第 72 条，共 321 条

标题: Reactant activation and photocatalysis mechanisms on Bi-metal@Bi2GeO5 with oxygen vacancies: A combined experimental and theoretical investigation

作者: Li, XW (Li, Xinwei); Zhang, WD (Zhang, Wendong); Cui, W (Cui, Wen); Li, JY (Li, Jieyuan); Sun, YJ (Sun, Yanjuan); Jiang, GM (Jiang, Guangming); Huang, HW (Huang, Hongwei); Zhang, YX (Zhang, Yuxin); Dong, F (Dong, Fan)

来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 370 页: 1366-1375 DOI: 10.1016/j.cej.2019.04.003 出版年: AUG 15 2019

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摘要: The photocatalysis process follows two fundamental sequences: reactant adsorption and surface photocatalysis. In this work, Bi metal-deposited Bi2GeO5 (Bi@BiGeO) is prepared as a model photocatalyst to understand the adsorption and activation mechanisms of the reactants and the photocatalytic oxidation of NO under visible light irradiation. Density functional theory and analytical approaches are employed to reveal the electronic structure and photo-induced carrier transfer processes. The introduction of Bi metal and the generation of oxygen vacancies (OVs) in BiGeO were achieved simultaneously via a facile method. The Bi metal served as a visible light antenna and as an electron sink and promoted the carrier separation and transfer. The OVs promote reactant (H2O and O-2) activation, thereby reinforcing the generation of reactive oxygen species (ROS). The NO molecules are actively adsorbed at the coordinative unsaturated sites on Bi@BiGeO and get activated via electron exchange. The photocatalytic NO oxidation mechanism on Bi@BiGeO is revealed based on the reaction intermediates and final products monitored using in-situ FTIR. This work highlights the importance of reactant activation as a new strategy for the design of highly efficient photocatalysts to overcome the bottlenecks in environmental applications.

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第 73 条，共 321 条

标题: Flood susceptibility modelling using novel hybrid approach of reduced-error pruning trees with bagging and random subspace ensembles

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摘要: Flooding is a very common natural hazard that causes catastrophic effects worldwide. Recently, ensemble-based techniques have become popular in flood susceptibility modelling due to their greater strength and efficiency in the prediction of flood locations. Thus, the aim of this study was to employ machine learning-based Reduced-error pruning trees (REPTree) with Bagging (Bag-REPTree) and Random subspace (RS-REPTree) ensemble frameworks for spatial prediction of flood susceptibility using a geographic information system (GIS). First, a flood spatial database was constructed with 363 flood locations and thirteen flood influencing factors, namely altitude, slope angle, slope aspect, curvature, stream power index (SPI), sediment transport index (STI), topographic wetness index (TWI), distance to rivers, normalized difference vegetation index (NDVI), soil, land use, lithology, and rainfall. Subsequently, correlation attribute evaluation (CAE) was used as the factor selection method for optimization of input factors. Finally, the receiver operating characteristic (ROC) curve, standard error (SE), confidence interval (CI) at 95%, and Wilcoxon signed-rank test were used to validate and compare the performance of the models. Results show that the RS-REPTree model has the highest prediction capability for flood susceptibility assessment, with the highest area under (the ROC) curve (AUC) value (0.949, 0.907), the smallest SE (0.011, 0.023), and the narrowest CI (95%) (0.928-0.970, 0.863-0.952) for the training and validation datasets. It was followed by the Bag-REPTree and REPTree models, respectively. The results also proved the superiority of the ensemble method over using these methods individually.

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第 74 条，共 321 条

标题: Current status, challenges, and policy suggestions for coalbed methane industry development in China: A review

作者: Tao, S (Tao, Shu); Chen, SD (Chen, Shida); Pan, ZJ (Pan, Zhejun)

来源出版物: ENERGY SCIENCE & ENGINEERING 卷: 7 期: 4 页: 1059-1074 DOI: 10.1002/ese3.358 出版年: AUG 2019

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摘要: China is vigorously promoting the development of coalbed methane (CBM) resources because CBM is cleaner than coal and a hazardous gas in coal mining. However, the CBM production in China is significantly lower than that in other coal-rich countries, such as Australia and the United States. In this paper, the main problems hindering CBM development in China are discussed to provide management suggestions for the government. These key problems include exploration and development techniques, the overlap of mining rights, management, financial supporting policy, investment environment, regulations, and market conditions. The results of this study indicate that to improve the development of the CBM industry in China, national and local governments must enact specific and exercisable regulations to increase financial support, improve technology, increase investment in CBM exploration, strengthen public project establishment, and improve the reform of CBM exploration and development policies.

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第 75 条，共 321 条

标题: The Role of Polarization in Photocatalysis

作者: Chen, F (Chen, Fang); Huang, HW (Huang, Hongwei); Guo, L (Guo, Lin); Zhang, YH (Zhang, Yihe); Ma, TY (Ma, Tianyi)

来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 58 期: 30 页: 10061-10073 DOI: 10.1002/anie.201901361 出版年: JUL 22 2019

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摘要: Semiconductor photocatalysis as a desirable technology shows great potential in environmental remediation and renewable energy generation, but its efficiency is severely restricted by the rapid recombination of charge carriers in the bulk phase and on the surface of photocatalysts. Polarization has emerged as one of the most effective strategies for addressing the above-mentioned issues, thus effectively promoting photocatalysis. This review summarizes the recent advances on improvements of photocatalytic activity by polarization-promoted bulk and surface charge separation. Highlighted is the recent progress in charge separation advanced by different types of polarization, such as macroscopic polarization, piezoelectric polarization, ferroelectric polarization, and surface polarization, and the related mechanisms. Finally, the strategies and challenges for polarization enhancement to further enhance charge separation and photocatalysis are discussed.

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第 76 条，共 321 条

标题: A human-machine adversarial scoring framework for urban perception assessment using street-view images

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摘要: Though global-coverage urban perception datasets have been recently created using machine learning, their efficacy in accurately assessing local urban perceptions for other countries and regions remains a problem. Here we describe a human-machine adversarial scoring framework using a methodology that incorporates deep learning and iterative feedback with recommendation scores, which allows for the rapid and cost-effective assessment of the local urban perceptions for Chinese cities. Using the state-of-the-art Fully Convolutional Network (FCN) and Random Forest (RF) algorithms, the proposed method provides perception estimations with errors less than 10%. The driving factor analysis from both the visual and urban functional aspects demonstrated its feasibility in facilitating local urban perception derivations. With high-throughput and high-accuracy scorings, the proposed human-machine adversarial framework offers an affordable and rapid solution for urban planners and researchers to conduct local urban perception assessments.

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标题: New Particle Formation in the Atmosphere: From Molecular Clusters to Global Climate

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摘要: New particle formation (NPF) represents the first step in the complex processes leading to formation of cloud condensation nuclei. Newly formed nanoparticles affect human health, air quality, weather, and climate. This review provides a brief history, synthesizes recent significant progresses, and outlines the challenges and future directions for research relevant to NPF. New developments include the emergence of state-of-the-art instruments that measure prenucleation clusters and newly nucleated nanoparticles down to about 1 nm; systematic laboratory studies of multicomponent nucleation systems, including collaborative experiments conducted in the Cosmics Leaving Outdoor Droplets chamber at CERN; observations of NPF in different types of forests, extremely polluted urban locations, coastal sites, polar regions, and high-elevation sites; and improved nucleation theories and parameterizations to account for NPF in atmospheric models. The challenges include the lack of understanding of the fundamental chemical mechanisms responsible for aerosol nucleation and growth under diverse environments, the effects of SO2 and NOx on NPF, and the contribution of anthropogenic organic compounds to NPF. It is also critical to develop instruments that can detect chemical composition of particles from 3 to 20 nm and improve parameterizations to represent NPF over a wide range of atmospheric conditions of chemical precursor, temperature, and humidity.

Plain Language Summary In the atmosphere, invisible to the human eye, there are many microscopic particles, or nanoparticles, that affect human health, air quality, and climate. We do not fully understand the chemical processes that allow these fine particles to form and be suspended in the air nor how they influence heat flow in Earth's atmosphere. Laboratory experiments, field observations, and modeling simulations have all shown different results for how these particles behave. These inconsistencies make it difficult to accurately represent the processes of new particle formation in regional and global atmospheric models. Scientists still need to develop instruments that can measure the smallest range of nanoparticles and to find ways to describe particle formation that allow for differences in temperature, humidity, and level of pollution.

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第 78 条，共 321 条

标题: Unprecedented Eighteen-Faceted BiOCl with a Ternary Facet Junction Boosting Cascade Charge Flow and Photo-redox

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摘要: Exposure of anisotropic crystal facets allows the directional transfer of photoexcited electrons (e(-)) and holes (h(+)), for spatial charge separation. High-index facets with a high density of low-coordinated atoms always serve as reactive catalytic sites. However, preparation of multi-facets or high-index facets is highly challenging for layered bismuth-based photocatalysts. Herein, we report the preparation of unprecedented eighteen-faceted BiOCl with {001} top facets and {102} and {112} oblique facets via a hydrothermal process. Compared to the conventional BiOCl square plates with {001} top facets and {110} lateral facets, the eighteen-faceted BiOCl has highly enhanced photocatalytic activity for H-2 evolution and hydroxyl radicals ((OH)-O-.) production. Theoretical calculations and photodeposition results disclose that the of eighteen-faceted BiOCl has a well-matched {001}/{102}/{112} ternary facet junction, which provides a cascade path for more efficient charge flow than the binary facet junction in BiOCl square plates.

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标题: Learning a Joint Affinity Graph for Multiview Subspace Clustering

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摘要: With the ability to exploit the internal structure of data, graph-based models have received a lot of attention and have achieved great success in multiview subspace clustering for multimedia data. Most of the existing methods individually construct an affinity graph for each single view and fuse the result obtained from each single graph. However, the common representation shared by different views and the complementary diversity across these views are not efficiently exploited. In addition, noise and outliers are often mixed in original data, which adversely degenerate the clustering performance of many existing methods. In this paper, we propose addressing these issues by learning a joint affinity graph for multiview subspace clustering based on a low-rank representation with diversity regularization and a rank constraint. Specifically, a low-rank representation model is employed to learn a shared sample representation coefficient matrix to generate the affinity graph. At the same time, we use diversity regularization to learn the optimal weights for each view, which can suppress the redundancy and enhance the diversity among different feature views. In addition, the cluster number is used to promote affinity graph learning by using a rank constraint. The final clustering result is obtained by using normalized cuts on the learned affinity graph. An efficient algorithm based on an augmented Lagrangian multiplier with alternating direction minimization is carefully designed to solve the resulting optimization problem. Extensive experiments on various real-world datasets are conducted, and the results demonstrate well the effectiveness of the proposed algorithm.

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标题: A Global Plate Model Including Lithospheric Deformation Along Major Rifts and Orogens Since the Triassic

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摘要: Global deep-time plate motion models have traditionally followed a classical rigid plate approach, even though plate deformation is known to be significant. Here we present a global Mesozoic-Cenozoic deforming plate motion model that captures the progressive extension of all continental margins since the initiation of rifting within Pangea at similar to 240 Ma. The model also includes major failed continental rifts and compressional deformation along collision zones. The outlines and timing of regional deformation episodes are reconstructed from a wealth of published regional tectonic models and associated geological and geophysical data. We reconstruct absolute plate motions in a mantle reference frame with a joint global inversion using hot spot tracks for the last 80 million years and minimizing global trench migration velocities and net lithospheric rotation. In our optimized model, net rotation is consistently below 0.2 degrees/Myr, and trench migration scatter is substantially reduced. Distributed plate deformation reaches a Mesozoic peak of 30 x 10(6) km(2) in the Late Jurassic (similar to 160-155 Ma), driven by a vast network of rift systems. After a mid-Cretaceous drop in deformation, it reaches a high of 48 x 10(6) km(2) in the Late Eocene (similar to 35 Ma), driven by the progressive growth of plate collisions and the formation of new rift systems. About a third of the continental crustal area has been deformed since 240 Ma, partitioned roughly into 65% extension and 35% compression. This community plate model provides a framework for building detailed regional deforming plate networks and form a constraint for models of basin evolution and the plate-mantle system.

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标题: Defining the morphological quality of fossil footprints. Problems and principles of preservation in tetrapod ichnology with examples from the Palaeozoic to the present

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摘要: The morphology of fossil footprints is the basis of vertebrate footprint ichnology. However, the processes acting during and after trace fossil registration which are responsible for the final morphology have never been precisely defined, resulting in a dearth of nomenclature. Therefore, we discuss the concepts of ichnotaphonomy, ichnostratinomy, taphonomy, biostratinomy, registration and diagenesis and describe the processes acting on footprint morphology. In order to evaluate the morphological quality of tetrapod footprints, we introduce the concept of morphological preservation, which is related to the morphological quality of footprints (M-preservation, acronym MP), and distinguish it from physical preservation (P-preservation, acronym PP), which characterizes whether or not a track is eliminated by taphonomic and diagenetic processes. M-preservation includes all the morphological features produced during and after track registration prior to its study, and may be divided into substages (ichnostratinomic, registrational, taphonomic, stratinomic, diagenetic). Moreover, we propose an updated numerical preservation scale for M-preservation. It ranges from 0.0 (worst preservation) to 3.0 (best preservation); intermediate values may be used and specific features may be indicated by letters. In vertebrate footprint ichnotaxonomy, we regard the anatomy-consistent morphology and to a lesser extent the trackway pattern as the only acceptable ichnotaxobases. Only footprints showing a good morphological preservation (grade 2.0-3.0) are useful in ichnotaxonomy, whereas ichnotaxa based on poor morphological preservation (grade 0.0-1.5) are considered ichnotaphotaxa (nomina dubia) characterized by extramorphologies. We applied the preservation scale on examples from the Palaeozoic to the present time, including three ichnotaphotaxa and 18 anatomy-consistent ichnotaxa/morphotypes attributed to several vertebrate footprint producers. Results indicate the utility, feasibility and suitability of this method for the entire vertebrate footprint record in any lithofacies, strongly recommending its use in future ichnotaxonomic studies.

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第 82 条，共 321 条

标题: The accuracy and efficiency of GA and PSO optimization schemes on estimating reaction kinetic parameters of biomass pyrolysis

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摘要: Reaction kinetic parameters estimation of biomass pyrolysis is a relatively difficult optimization problem due to the complexity of pyrolysis model. Two common heuristic algorithms, Genetic Algorithm (GA) and Particle Swarm Optimization (PSO), are applied to estimate the kinetic parameters of three-component parallel reaction mechanism based on the thermogravimetric experiment in wide heating rates. The accuracy and efficiency of GA and PSO algorithms are compared with each other under the identical optimization conditions. The results indicate the better optimization abilities of PSO with the closer convergence solution to the global optimum and quicker convergence to the solution than GA based on the three-component parallel reaction mechanism of biomass pyrolysis. Especially, the improvement of best fitting value of PSO reaches up to 30% compared with that of GA. Furthermore, 14 estimated kinetic parameters of best fitting value are obtained and the mass loss rate predicted results including three separate components (hemicellulose, cellulose and lignin) are compared with experimental data. (C) 2019 Elsevier Ltd. All rights reserved.

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标题: Surface-Halogenation-Induced Atomic-Site Activation and Local Charge Separation for Superb CO2 Photoreduction

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摘要: Solar-energy-driven CO2 conversion into value-added chemical fuels holds great potential in renewable energy generation. However, the rapid recombination of charge carriers and deficient reactive sites, as two major obstacles, severely hampers the photocatalytic CO2 reduction activity. Herein, a desirable surface halogenation strategy to address the aforementioned concerns over a Sillen-related layer-structured photocatalyst Bi2O2(OH)(NO3) (BON) is demonstrated. The surface halogen ions that are anchored on the Bi atoms by replacing surface hydroxyls on the one hand facilitate the local charge separation, and, on the other hand, activate the hydroxyls that profoundly boost the adsorption of CO2 molecules and protons and facilitate the CO2 conversion process, as evidenced by experimental and theoretical results collectively. Among the three series of BON-X (X = Cl, Br, and I) catalysts, BON-Br shows the most substantially enhanced CO production rate (8.12 mu mol g(-1) h(-1)) without any sacrificial agents or cocatalysts, approximate to 73 times higher than that of pristine Bi2O2(OH)(NO3), also exceeding that of the state-of-the-art photocatalysts reported to date. This work presents a surface polarization protocol for engineering charge behavior and reactive sites to promote photocatalysis, which shows great promise to the future design of high-performance materials for clean energy production.

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标题: Regional analysis of the green development level differences in Chinese mineral resource-based cities

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摘要: Mineral resource exploitation has a negative impact on the immediate environment. Green development has been promoted as a new method for economic growth and environmental protection because of increasingly serious resource and environmental issues. Evaluating the green development level (GDL) of mineral resource based cities (MRBC) is beneficial to understanding the key drawbacks in the green development process in each city. In this study, a comprehensive GDL evaluation index system is constructed from societal, economic, and environmental perspectives. The entropy method and AHP are used to empower the index, and a GM (1, 1) model is then utilized to forecast the GDL of each city. A time series weighting method is also employed to determine the comprehensive GDL in each city during the 11th, 12th, and 13th Five-Year Plan. The GDL in the eastern, northeastern, central, and western regions is comprehensively analyzed, and the following observations are found: (1) the changes in GDL in most MRBC in China were good, and 25% of the cities were lagging behind; (2) the GDL in MRBC had significant regional differences and were progressively low from east to west; (3) from 2006 to 2020, the GDL in MRBC in the western region was rapidly promoted, whereas the GDL in the eastern region was deteriorating, and a polarizing trend emerged in the northeastern region. The proportion of the four categories, namely, A, B, C, and D, in the central region was gradually showing an equal value. Finally, countermeasures to improve the GDL in MRBC are proposed to provide a reference for sustainable development.

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第 85 条，共 321 条

标题: Comparison of convolutional neural networks for landslide susceptibility mapping in Yanshan County, China

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来源出版物: SCIENCE OF THE TOTAL ENVIRONMENT 卷: 666 页: 975-993 DOI: 10.1016/j.scitotenv.2019.02.263 出版年: MAY 20 2019

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摘要: Assessments of landslide disasters are becoming increasingly urgent. The aim of this study is to investigate a convolutional neural network (CNN) framework for landslide susceptibility mapping (LSM) in Yanshan County, China. The two primary contributions of this study arc summarized as follows. First. W the best of our knowledge, this report describes the first time that the CNN framework is used for LSM.Second, different data representation algorithms arc developed to construct three novel CNN architectures. In this work, sixteen influencing factors associated with landslide occurrence were considered and historical landslide locations were randomly divided into training (70% of the total) and validation (30%) sets. Validation of these CNNs was performed using different commonly used measures in comparison to several of the most popular machine learning and deep learning methods. The experimental results demonstrated that the proportions of highly susceptible zones in all of the CNN landslide susceptibility maps are highly similar and lower than 30%, which indicates that these CNNs are more practical for landslide prevention and management than conventional methods. Furthermore, the proposed CNN framework achieved higher or comparable prediction accuracy. Specifically, the proposed CNNs were 3.94%-7.45% and 0.079-0.151 higher than those of the optimized support vector machine (SVM) in terms of overall accuracy (OA) and Matthews correlation coefficient (MCC), respectively. (C) 2019 Elsevier B.V. All rights reserved.

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第 86 条，共 321 条

标题: Microplastic abundance, characteristics, and removal in wastewater treatment plants in a coastal city of China

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来源出版物: WATER RESEARCH 卷: 155 页: 255-265 DOI: 10.1016/j.watres.2019.02.028 出版年: MAY 15 2019

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摘要: Studying the abundance, characteristics, and removal of microplastics (MPs) in wastewater treatment plants (WWTPs) in coastal cities is of great significance for understanding the impacts of human activities on the marine environment, but currently, little information on this topic is available in China. Therefore, the abundance, characteristics, and removal of MPs in seven WWTPs of Xiamen, a typical coastal city in China, are studied. Sixty samples were collected using an improved sampling method involving an electromagnetic flowmeter and a fast digital camera. The influent MN concentration is 1.57-13.69 items/L, and it is reduced to 0.20-1.73 items/L in the effluent, indicating that 79.3-97.8% MPs is removed. Based on the daily effluent discharge and MPs removal rate, it is estimated that similar to 6.5 x 10(8) MPs are released from the seven WWTPs into the Xiamen Bay each day. The light microscopic and micro-Raman spectroscopic analysis indicates that similar to 62.68% of particles are plastic polymers, including polypropylene (31.6%), polyethylene (21.9%), polystyrene (10.1%), propylene/ethylene copolymer (9.2%), and polyethylene terephthalate (7.5%). The color of MPs is mainly composed of white (27.3%) and clears (25.8%). Our results show that granules (41.1%) are the dominant shape of MPs, followed by fragments (31.3%), fibers (23.7%), and pellet (3.9%). The characteristics of MPs such as sizes, shapes, and types affect the MPs removal in WWTPs. Our findings show that MPs concentration in the influent is positively correlated with the suspended solids (SS), however, in the effluent, it is associated with the WWTPs operating load, as reflected by obviously higher MP abundance in overloaded ones. (C) 2019 Elsevier Ltd. All rights reserved.

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第 87 条，共 321 条

标题: Deep learning and its application in geochemical mapping

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来源出版物: EARTH-SCIENCE REVIEWS 卷: 192 页: 1-14 DOI: 10.1016/j.earscirev.2019.02.023 出版年: MAY 2019

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摘要: Machine learning algorithms have been applied widely in the fields of natural science, social science and engineering. It can be expected that machine learning approaches especially deep learning algorithms will help geoscientists to discover mineral deposits through processing of various geoscience datasets. This study reviews the state-of-the-art application of deep learning algorithms for processing geochemical exploration data and mining the geochemical patterns. Deep learning algorithms can deal with complex and nonlinear problems and, therefore, can enhance the identification of geochemical anomalies and the recognition of hidden patterns. Applied geochemistry needs more applications of machine learning and/or deep learning algorithms.

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标题: Progress on the Photocatalytic Reduction Removal of Chromium Contamination

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摘要: Rapid industrialization leads to increased wastewater discharge encompassing hexavalent chromium (Cr(VI)), which leads to serious environmental problems of toxicity and potential carcinogenicity. Removal of these species is normally carried out by ion-exchange, precipitation, membrane filtration, sorption, photocatalytic reduction, etc. This review mainly focuses on the photocatalytic and photoelectrocatalytic (PEC) reduction of Cr (VI), because of their advantages over other methods such as reduced risk of secondary pollution by non-reduced Cr (VI), no sludge formation, no need for a large amount of chemical reagents, clean and easy installation. The main factors influencing the photocatalytic reduction efficiency of Cr (VI) such as catalyst activity, solution pH, Cr adsorption on the catalyst and additives, are briefly discussed. Finally, a special emphasis is provided to the photoelectrocatalytic (PEC) reduction of Cr (VI).

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标题: Mesozoic tectono-magmatic response in the East Asian ocean-continent connection zone to subduction of the Paleo-Pacific Plate

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摘要: The Mesozoic Western Pacific subduction system significantly impacted the North China and South China blocks along the East Asian continental margin and influenced the tectonic, magmatic, metallogenic and geomorphic evolution of the region. However, the dynamics and impact on the zone along the East Asian ocean-continent connection zone remain debated. Here we provide a comprehensive synthesis of the state-of-the-art information from deformation analysis, magmatism, geochronology, tomography and other fields from this region. We evaluate first the pre-Yanshanian (pre-Jurassic) final assembly of blocks and the Late Triassic formation of the unified continental margin in East China. We then focus on the Jurassic and Cretaceous geological processes in the East Asian ocean-continent connection zone. The temporal and spatial evolution of structural propagation, sedimentary depocentre, age zonation and migration of magrnatism, as well as the large-scale tectono-morphological inversion in the Earth surface system combined with deep processes, are probed. In the early Yanshannian Period (Early and Middle Jurassic, 200-160 Ma), the destruction of the North China Craton (NCC) was mainly affected by the westward early-stage layered rollback, and stepwise delamination and thinning of its continental lithosphere, resulting in the early Yanshanian westward migration of tectonism and magmatism.

Coevally, the combined effect of the closure of the Mongal-Okhotsk Ocean to the north and the subduction of the Bangong-Co- Nujiang Ocean to the south imparted an overall compressional setting in the East Asian OceanContinent Connection Zone (EAOCCZ). The centres of asthenospheric upwelling and mantle extrusion at depth continued to migrate eastward, driving the eastward lithospheric thinning with periodic and alternating extension and compression. The South China Block experienced a westward flat subduction during the early Yanshanian Period, resulting in the westward propagation of deformation and magmatism, followed by late twostage delamination to induce the eastward tectono-magmatism. The difference in tectono-magmatic styles between the North China and South China blocks is a result of the different mechanisms and syles of the deep delamination processes under the superconvergence regime of the East Asian and adjacent plates. Especially delamination under North China generated the northwestward layered and fractured subcontinental lithospheric mantle, whereas under the eastern South China Block, were the oceanic lithospheric mantle of the Paleo- Pacific Plate that underwent flat subduction, or continental garnet peridotite mantle. In the middle Yanshanian Period (Late Jurassic to early Early Cretaceous, 160-125 Ma), the EAOCCZ underwent escape tectonics to form some basins related to strike slip faulting. Generally the extensional basins in the tails of the triangular-shaped escape blocks are perpendicular to the extrusion direction. The transtensional or transpressional basins are controlled by the strike slip faults distributed on both sides of the triangular block, and the flexural basins occur in front. In the late Yanshanian Period (late Early Cretaceous-Late Cretaceous, 125-65 Ma), the Paleo-Pacific (Izanagi) Plate subducted NNW-ward beneath the Eurasian continent, and the subduction angles changed gradually following eastward mantle extrusion induced by the closure of the Okhotsk Ocean to the north and Bangong-Nujiang Ocean to the south, as well as the rollback and subduction retreat of the Paleo-Pacific Plate to the east. The EAOCCZ gradually experienced lithospheric collapse and the formation of metamorphic core complexes, as well as obvious landscape reversal. During 70-45 Ma, the Izanagi-Pacific Ridge subducted beneath the EAOCCZ to induce wide uplift resulting in the formation of the Cenozoic dextral transtension-related basins.

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第 90 条，共 321 条

标题: Using deep learning to examine street view green and blue spaces and their associations with geriatric depression in Beijing, China

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摘要: Background: Residential green and blue spaces may be therapeutic for the mental health. However, solid evidence on the linkage between exposure to green and blue spaces and mental health among the elderly in non-Western countries is scarce and limited to exposure metrics based on remote sensing images (i.e., land cover and vegetation indices). Such overhead-view measures may fail to capture how people perceive the environment on the site.

Objective: This study aimed to compare streetscape metrics derived from street view images with satellite-derived ones for the assessment of green and blue space; and to examine associations between exposure to green and blue spaces as well as geriatric depression in Beijing, China.

Methods: Questionnaire data on 1190 participants aged 60 or above were analyzed cross-sectionally. Depressive symptoms were assessed through the shortened Geriatric Depression Scale (GDS-15). Streetscape green and blue spaces were extracted from Tencent Street View data by a fully convolutional neural network. Indicators derived from street view images were compared with a satellite-based normalized difference vegetation index (NDVI), a normalized difference water index (NDWI), and those derived from GlobeLand30 land cover data on a neighborhood level. Multilevel regressions with neighborhood-level random effects were fitted to assess correlations between GDS-15 scores and these green and blue spaces exposure metrics.

Results: The average cumulative GDS-15 score was 3.4 (i.e., no depressive symptoms). Metrics of green and blue space derived from street view images were not correlated with satellite-based ones. While NDVI was highly correlated with GlobeLand30 green space, NDWI was moderately correlated with GlobeLand30 blue space. Multilevel regressions showed that both street view green and blue spaces were inversely associated with GDS-15 scores and achieved the highest model goodness-of-fit. No significant associations were found with NDVI, NDWI, and GlobeLand30 green and blue space. Our results passed robustness tests.

Conclusion: Our findings provide support that street view green and blue spaces are protective against depression for the elderly in China, yet longitudinal confirmation to infer causality is necessary. Street view and satellite-derived green and blue space measures represent different aspects of natural environments. Both street view data and deep learning are valuable tools for automated environmental exposure assessments for health-related studies.

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标题: Analysis of transmission dynamics for Zika virus on networks

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摘要: Transmission of Zika virus (ZIKV) is a serious problem in public health, which can make the babies suffer from microcephaly if their mothers are infected by ZIKV during pregnancy. In this paper, we develop a model of ZIKV transmission in Colombia on complex networks which considers both sexual transmission among humans and the transmission by an infective vector in the process of propagation. We estimate the basic reproduction number R-0 and prove that the disease-free equilibrium is globally asymptotically stable when R-0 < 1. In addition, we study the effects of sexual transmission and the transmission route by an infective vector on the process of propagation. Invasion regions of ZIKV were shown in two-parameters space. The obtained results may provide new insights for the control of ZIKV. (C) 2018 Published by Elsevier Inc.

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标题: Parameter extraction of photovoltaic models using an improved teaching-learning-based optimization

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摘要: Accurate and reliable parameter extraction of photovoltaic (PV) models is urgently desired for the simulation, evaluation, control, and optimization of PV systems. Although many meta-heuristic algorithms have been used to extract the PV parameters, the extracted parameters are usually not very accurate and reliable. To accurately and reliably extract the parameters of different PV models, an improved teaching-learning-based optimization (ITLBO) algorithm is proposed in this paper. The novelty of ITLBO lies primarily in the improved teaching and learning strategies with two improvements: (i) the teacher adopts different teaching strategies according to learner levels in the teacher phase; and (ii) in the learner phase, a new learning strategy is proposed to balance exploration and exploitation. The performance of ITLBO is verified by extracting the parameters of the single diode model, the double diode model, and three PV modules. The experimental results indicate that ITLBO obtains better performance with respect to accuracy and reliability compared to the other algorithms.

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ESI 高被引论文: Y

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输出日期: 2023-09-04

第 93 条，共 321 条

标题: Bifurcation analysis of two disc dynamos with viscous friction and multiple time delays

作者: Wei, ZC (Wei, Zhouchao); Zhu, B (Zhu, Bin); Yang, J (Yang, Jing); Perc, M (Perc, Matjaz); Slavinec, M (Slavinec, Mitja)

来源出版物: APPLIED MATHEMATICS AND COMPUTATION 卷: 347 页: 265-281 DOI: 10.1016/j.amc.2018.10.090 出版年: APR 15 2019

Web of Science 核心合集中的 "被引频次": 53

被引频次合计: 53

摘要: The impact of multiple time delays on the dynamics of two disc dynamos with viscous friction is studied in this paper. We consider the stability of equilibrium states for different delay values, and determine the location of relevant Hopf bifurcations using the normal form method and the center manifold theory. By performing numerical calculations and analysis, we verify the validity of our analytically obtained results. Our research results reveal a classical period-doubling route towards deterministic chaos in the studied system, and play an important role for the better understanding of the complex dynamics of two disc dynamos with viscous friction subject to multiple time delays. (C) 2018 Elsevier Inc. All rights reserved.

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输出日期: 2023-09-04

第 94 条，共 321 条

标题: Finite-time synchronization of memristor chaotic systems and its application in image encryption

作者: Wang, LM (Wang, Leimin); Dong, TD (Dong, Tiandu); Ge, MF (Ge, Ming-Feng)

来源出版物: APPLIED MATHEMATICS AND COMPUTATION 卷: 347 页: 293-305 DOI: 10.1016/j.amc.2018.11.017 出版年: APR 15 2019

Web of Science 核心合集中的 "被引频次": 120

被引频次合计: 122

摘要: This paper investigates the finite-time synchronization of memristor chaotic systems (MCSs). First, an emulator circuit of memristor is designed to implement the MCSs. Then, based on the presented emulator circuit, the model of the MCSs is provided and its finite-time synchronization problem is successfully achieved under the proposed controller. Thereafter, the stability analysis of the closed-loop dynamics is derived and the effectiveness of the theoretical results is testified via numerical simulations. Finally, an image encryption algorithm is proposed based on MCSs. The statistical performance analysis reflects the effectiveness of the image encryption algorithm and shows its potential applications in secure communication. (C) 2018 Elsevier Inc. All rights reserved.

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输出日期: 2023-09-04

第 95 条，共 321 条

标题: Evidence for a prolonged Permian-Triassic extinction interval from global marine mercury records

作者: Shen, J (Shen, Jun); Chen, JB (Chen, Jiubin); Algeo, TJ (Algeo, Thomas J.); Yuan, SL (Yuan, Shengliu); Feng, QL (Feng, Qinglai); Yu, JX (Yu, Jianxin); Zhou, L (Zhou, Lian); O'Connell, B (O'Connell, Brennan); Planavsky, NJ (Planavsky, Noah J.)

来源出版物: NATURE COMMUNICATIONS 卷: 10 文献号: 1563 DOI: 10.1038/s41467-019-09620-0 出版年: APR 5 2019

Web of Science 核心合集中的 "被引频次": 113

被引频次合计: 120

摘要: The latest Permian mass extinction, the most devastating biocrisis of the Phanerozoic, has been widely attributed to eruptions of the Siberian Traps Large Igneous Province, although evidence of a direct link has been scant to date. Here, we measure mercury (Hg), assumed to reflect shifts in volcanic activity, across the Permian-Triassic boundary in ten marine sections across the Northern Hemisphere. Hg concentration peaks close to the Permian-Triassic boundary suggest coupling of biotic extinction and increased volcanic activity. Additionally, Hg isotopic data for a subset of these sections provide evidence for largely atmospheric rather than terrestrial Hg sources, further linking Hg enrichment to increased volcanic activity. Hg peaks in shallow-water sections were nearly synchronous with the end-Permian extinction horizon, while those in deep-water sections occurred tens of thousands of years before the main extinction, possibly supporting a globally diachronous biotic turnover and protracted mass extinction event.

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ESI 热点论文: N

输出日期: 2023-09-04

第 96 条，共 321 条

标题: Effects of surface coal mining and land reclamation on soil properties: A review

作者: Feng, Y (Feng, Yu); Wang, JM (Wang, Jinman); Bai, ZK (Bai, Zhongke); Reading, L (Reading, Lucy)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 191 页: 12-25 DOI: 10.1016/j.earscirev.2019.02.015 出版年: APR 2019

Web of Science 核心合集中的 "被引频次": 181

被引频次合计: 201

摘要: Opencast coal mining has a series of consequences on land resources and places enormous pressure on the ecological environment. Stripping, excavation, transportation and dumping have different effects on soil physical, chemical and biological properties. Moreover, the reconstructed landscape produces increased small-scale spatial heterogeneity of mined soils. Currently, growing concerns for the negative consequences of mining have highlighted the importance of reclamation in minesoil studies. This review has examined the mechanisms of coal mining and reclamation that affect soil properties (physical, chemical, biological) and described soil development in reclamation, with an emphasis on the reclaimed minesoil (RMS) properties of reclamation sites. The major conclusions of this review were: (i) The randomness of soil dumping increased the heterogeneity of minesoil properties, which in turn increased the complexity of reclamation practice. (ii) The negative or positive consequences of mining and reclamation processes on RMS need to be recognized by scientific observations such as soil property multi-index analysis and soil chronosequences, on which the minesoil reconstruction practice are based. (iii) Five phases of reclamation (Le., geomorphic reshaping, soil reconstruction, hydrological stability, vegetation restoration, and landscape rebuilding) should be considered as a comprehensive system for the reconstruction of minesoils. (iv) The application of new technologies (e.g., micro-terrain reshaping and soil non-destructive detection) and new studies (e.g., systematic study, rebuilding animal habitat, and biodiversity research) to minesoil recovery practice would enhance the new concepts of land reclamation and ecological restoration in mining areas.

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ESI 热点论文: N

输出日期: 2023-09-04

第 97 条，共 321 条

标题: Analysis on land ecological security change and affect factors using RS and GWR in the Danjiangkou Reservoir area, China

作者: Liu, CX (Liu, Chaoxian); Wu, XL (Wu, Xueling); Wang, L (Wang, Lei)

来源出版物: APPLIED GEOGRAPHY 卷: 105 页: 1-14 DOI: 10.1016/j.apgeog.2019.02.009 出版年: APR 2019

Web of Science 核心合集中的 "被引频次": 74

被引频次合计: 77

摘要: The Danjiangkou reservoir area is a main water source and the submerged area of the middle route of the South to-North Water Transfer Project of China. Thus, variations in land ecological security (eco-security) have attracted considerable attention. In this study, to evaluate the land eco-security situation of the reservoir in 1996, 2006 and 2016, we used spatial principal component analysis (sPCA) to comprehensively consider different effect factors and avoid subjectivity in the appraisals to obtain the weights and correlations between different assessment indicators. Then, we used spatial autocorrelation to analyse the spatio-temporal pattern variation characteristics. Finally, we used ordinary least squares (OLS) and geographically weighted regression (GWR) models to analyse the key factors influencing land eco-security and the concrete spatial relationships. The study results showed that the areas of the highly secure (I) regions decreased significantly from 1996 to 2016; these regions are mainly located around the reservoir. Spatially, the regions with safe eco-environments gradually tended to scatter from 1996 to 2006, while those with safe eco-security tended to cluster from 2006 to 2016. Based on the quantitative statistics and the visualized GWR model, different spatio-temporal eco-security responses to soil erosion and human activities occurred in different years. It was concluded that although the eco-security of the reservoir improved due to beneficial soil controls and water loss treatments, the expanding impact of human activities should be carefully monitored.

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ESI 热点论文: N

输出日期: 2023-09-04

第 98 条，共 321 条

标题: Time series analysis and long short-term memory neural network to predict landslide displacement

作者: Yang, BB (Yang, Beibei); Yin, KL (Yin, Kunlong); Lacasse, S (Lacasse, Suzanne); Liu, ZQ (Liu, Zhongqiang)

来源出版物: LANDSLIDES 卷: 16 期: 4 页: 677-694 DOI: 10.1007/s10346-018-01127-x 出版年: APR 2019

Web of Science 核心合集中的 "被引频次": 154

被引频次合计: 165

摘要: A good prediction of landslide displacement is an essential component for implementing an early warning system. In the Three Gorges Reservoir Area (TGRA), many landslides deform distinctly and in steps from April to September each year under the influence of seasonal rainfall and periodic fluctuation in reservoir water level. The sliding becomes more uniform again from October to April. This landslide deformation pattern leads to accumulated displacement versus time showing a step-wise curve. Most of the existing predictive models express static relationships only. However, the evolution of a landslide is a complex nonlinear dynamic process. This paper proposes a dynamic model to predict landslide displacement, based on time series analysis and long short-term memory (LSTM) neural network. The accumulated displacement was decomposed into a trend term and a periodic term in the time series analysis. A cubic polynomial function was selected to predict the trend displacement. By analyzing the relationships between landslide deformation, rainfall, and reservoir water level, a LSTM model was used to predict the periodic displacement. The LSTM approach was found to properly model the dynamic characteristics of landslides than static models, and make full use of the historical information. The performance of the model was validated with the observations of two step-wise landslides in the TGRA, the Baishuihe landslide and Bazimen landslide. The application of the model to those two landslides demonstrates that the LSTM model provides a good representation of the measured displacements and gives a more reliable prediction of landslide displacement than the static support vector machine (SVM) model. It is concluded that the proposed model can be used to effectively predict the displacement of step-wise landslides in the TGRA.

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ESI 热点论文: N

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第 99 条，共 321 条

标题: Trade-offs in land-use competition and sustainable land development in the North China Plain

作者: Jin, G (Jin, Gui); Chen, K (Chen, Kun); Wang, P (Wang, Pei); Guo, BS (Guo, Baishu); Dong, Y (Dong, Yin); Yang, J (Yang, Jun)

来源出版物: TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE 卷: 141 页: 36-46 DOI: 10.1016/j.techfore.2019.01.004 出版年: APR 2019

Web of Science 核心合集中的 "被引频次": 122

被引频次合计: 127

摘要: Using the Computable General Equilibrium of Land Use Change (CGELUC) and Dynamics of Land System (DLS) models, we simulated land-use structures and patterns in Shandong Province in 2025 under three scenarios: baseline, resource consumption, and green development. Compared with the situation in 2015, a slight decrease in grassland, cultivated, and unused land was evident under the green development scenario. Forest land cover remained basically unchanged, whereas water bodies and construction land increased slightly. Under the baseline and resource consumption scenarios, all of the above land-use types showed a decreasing trend apart from construction land, which rapidly increased. Changes in the land-use allocation pattern demonstrated overall consistency and local differences under these scenarios. Among them, most changes in construction and cultivated land occurred around cities, with changes in forests and grassland mainly distributed in the central and northeastern regions. Changes in water bodies and unused land mainly occurred in the northern Yellow River basin and in northeastern coastal areas. Local differences were evident under the green development scenario, with conversion of a small amount of cultivated land in the central region into forests and grassland, and transformation of a small area of cultivated land in the northeastern coastal area into water bodies. The study's findings provide a scientific projection of competitive land-use relations in Shandong Province over the next decade under different land expropriation price and regulation scenarios, which can guide policy formulation and the selection of pathways for achieving sustainable regional development.

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输出日期: 2023-09-04

第 100 条，共 321 条

标题: Earth abundant materials beyond transition metal dichalcogenides: A focus on electrocatalyzing hydrogen evolution reaction

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来源出版物: NANO ENERGY 卷: 58 页: 244-276 DOI: 10.1016/j.nanoen.2019.01.017 出版年: APR 2019

Web of Science 核心合集中的 "被引频次": 235

被引频次合计: 243

摘要: The depletion of the unsustainable fossil fuels drives the exploration of renewable and clean energy. Hydrogen gas, as the potential alternative for the future energy supply, is now considered as the primary choice. Recently, with the assistance of the non-noble metal based compounds, electrocatalytic hydrogen evolution has aroused tremendous attention. In particular, earth abundant materials beyond transition metal dichalcogenides, such as transition metal phosphides, carbides, nitrides, demonstrate highly active and efficient activity toward hydrogen evolution reaction (HER) under different conditions. In this review, focused on these materials, we systemically discuss their recent development in electrocatalytic hydrogen generation. The synthesis routes utilized to prepare superior and specific catalyst are highlighted. Then, we provide insight into the characterization and electrochemical performance of these materials as HER electrocatalysts. In the end, the challenges of these materials, important issues about studying eletablctrocatalysts and future perspectives are stressed.

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ESI 热点论文: N

输出日期: 2023-09-04

第 101 条，共 321 条

标题: Mercury in marine Ordovician/Silurian boundary sections of South China is sulfide-hosted and non-volcanic in origin

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来源出版物: EARTH AND PLANETARY SCIENCE LETTERS 卷: 511 页: 130-140 DOI: 10.1016/j.epsl.2019.01.028 出版年: APR 1 2019

Web of Science 核心合集中的 "被引频次": 118

被引频次合计: 125

摘要: Mercury (Hg) enrichment in stratigraphic successions is now widely used as a proxy for volcanic inputs, often for the purpose of documenting a relationship between large igneous province (LIP) magmatism and ecosystem perturbations. Earlier studies of Hg in Ordovician/Silurian boundary (OSB) sections in South China and Laurentia identified transient spikes in Hg/TOC ratios, on the basis of which a link between volcanism and the Late Ordovician mass extinction (LOME) was claimed. However, Hg enrichments must be tested based on normalization to their main host phase, and Hg/TOC is a suitable proxy only if Hg is mainly complexed by organic matter in the sediment. Here, we demonstrate that Hg in three OSB sections in South China (Qjliao, Yanzhi, and Jiaoye) is overwhelmingly associated with pyrite, as shown by r((Hg-TS)) > 0.9 (versus r((Hg-TOC)) < 0.1) and by EDS elemental mapping. This association requires that Hg concentrations be normalized to pyrite content as proxied by total sulfur [TS], rather than to total organic carbon [TOC]. The resulting Hg/TS profiles show no significant enrichments at any level within the Upper Ordovician-lower Silurian of the study sections. Also, mercury isotope data show constant mass-independent fractionation (Delta Hg-199) values (+0.11 +/- 0.03 parts per thousand) that are inconsistent with volcanic inputs. We therefore infer that previous reports of Hg enrichments in OSB sections were due to the presence of Hg-rich sulfides, and that Hg data from both the present and earlier studies provide no evidence of any volcanic influences on the LOME. The results of the present study highlight the need for caution in applying the Hg proxy for volcanic inputs and the importance of evaluating the main host phase of Hg in paleo-marine sediments. (C) 2019 Elsevier B.V. All rights reserved.

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ESI 热点论文: N

输出日期: 2023-09-04

第 102 条，共 321 条

标题: Human health risks of heavy metals in paddy rice based on transfer characteristics of heavy metals from soil to rice

作者: Mao, CP (Mao, Changping); Song, YX (Song, Yinxian); Chen, LX (Chen, Lingxiao); Ji, JF (Ji, Junfeng); Li, JZ (Li, Jizhou); Yuan, XY (Yuan, Xuyin); Yang, ZF (Yang, Zhongfang); Ayoko, GA (Ayoko, Godwin A.); Frost, RL (Frost, Ray L.); Theiss, F (Theiss, Frederick)

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Web of Science 核心合集中的 "被引频次": 174

被引频次合计: 195

摘要: In order to investigate the transfer and accumulation pathways of heavy metals in cropland ecosystems, an investigation of the geochemical behaviors of heavy metals in soil and rice plants was carried out in the Yangtze River Delta. Soil is one of the biggest reservoirs of heavy metals and affects food safety at the beginning of the food chain. The results of this study demonstrate that heavy metal levels in soil decreased with increasing soil pH, while rice shoots accumulated heavy metals more readily under low soil pH conditions. The non-carcinogenic hazard quotients (HQ) of heavy metals show that health risks for humans were primarily due to Pb and As. Furthermore, cancer risk (Risk) results suggested that similar to 76% and similar to 15.7% of cancer risk was caused by Cd and As levels, respectively. Decreasing soil pH enhanced the non-carcinogenic and carcinogenic health risks for the human body. Through exponential change between transfer factor (TFgrain/soll) and soil metals, HQ, a direct monitoring method for rice plants, was built using regression curves. It is proposed that besides condition of soil with high heavy metal concentration, for rice grown with surface soil metals, the safety of the rice product should be monitored when soil metals are under the following levels after harvest: non-carcinogenic risk, As < 20 mg/kg, Pb < 100 mg/kg, Cd < 0.07-0.68 mg/kg and Cu 7.56-30.87 mg/kg; and cancer risk, As < 20 mg/kg, Cd < 4 mg/kg and Cr < 200 mg/kg.

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第 103 条，共 321 条

标题: UNIQUENESS AND GLOBAL STABILITY OF FORCED WAVES IN A SHIFTING ENVIRONMENT

作者: Wang, JB (Wang, Jia-Bing); Zhao, XQ (Zhao, Xiao-Qiang)

来源出版物: PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY 卷: 147 期: 4 页: 1467-1481 DOI: 10.1090/proc/14235 出版年: APR 2019

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摘要: This paper deals with the uniqueness and global stability of forced extinction waves for the nonlocal dispersal Fisher-KPP equation in a shifting environment where the favorable habitat is shrinking. Specifically, we first obtain the uniqueness by using the sliding technique and then establish the global exponential stability via the monotone semiflows approach combined with the method of super- and subsolutions. Our developed arguments can also be used to prove the same conclusion for the corresponding random diffusion problem.

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第 104 条，共 321 条

标题: Mechanisms of shale gas adsorption: Evidence from thermodynamics and kinetics study of methane adsorption on shale

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来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 361 页: 559-570 DOI: 10.1016/j.cej.2018.11.185 出版年: APR 1 2019

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被引频次合计: 177

摘要: Studies on the mechanisms of shale gas adsorption are of great significance for shale gas accumulation and reserves evaluation. In order to investigate the mechanisms of shale gas adsorption from the perspective of methane adsorption thermodynamics and kinetics, high-pressure methane adsorption and adsorption kinetics experiments were measured at 40.6 degrees C, 60.6 degrees C, 75.6 degrees C and 95.6 degrees C at pressures up to 52 MPa for the Lower Silurian Longmaxi shale sample collected from the Southern Sichuan Basin, China. The adsorption isotherms and kinetics curves of methane were obtained and a detailed analysis was performed. The results indicate that (1) Under the condition of 0-52 MPa, the absolute adsorption isotherm of methane on shale has the characteristics of type I adsorption isotherm. Temperature has an important effect on the maximum excess and absolute adsorption of methane. At the same temperature, the absolute adsorption amount of methane on shale increases slower at a higher pressure, which suggests that the methane adsorption rate decreases at a higher pressure. (2) The average isosteric heat of adsorption of methane on shale is 21.06 kJ/mol, indicating that the dominant adsorption process of methane on shale may be physical adsorption. The isosteric heat of adsorption increases with increasing absolute methane adsorption amount, indicating that the adsorption heat is mainly affected by the interaction between the adsorbed methane molecules. (3) Bangham kinetic model can be used to describe the dynamic adsorption process of methane on shale. Higher temperature and pressure lead to a lower Bangham adsorption rate constant, which makes it more difficult to adsorb methane molecules for shale. This is consistent with the conclusion drawn from the thermodynamics study of absolute adsorption isotherms of methane on shale.

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第 105 条，共 321 条

标题: Synergistic integration of Bi metal and phosphate defects on hexagonal and monoclinic BiPO4: Enhanced photocatalysis and reaction mechanism

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来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 243 页: 313-321 DOI: 10.1016/j.apcatb.2018.10.055 出版年: APR 2019

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摘要: Bi metal deposited hexagonal BiPO4 with the exposure of {102} facet (Bi-HBPO-102) and Bi metal deposited monoclinic BiPO4 with the exposure of {120} facet (Bi-MBPO-120) were prepared by chemical deposition method and solvothermal approach, respectively. The as-prepared catalysts presented more efficient photo catalytic activity of NO removal than pure BiPO4 (2.0% for BiPO4, 51.4% for Bi-HBPO-102 and 36.2% for Bi-MBPO-120) under visible light irradiation, which can be attributed to the synergistic effects endowed by the phosphate defect, the surface plasmon resonance (SPR) effect of Bi metal and the facet effect. The existence of phosphate defect was confirmed by the XPS and solid state EPR technique. The DFT calculation revealed the position of phosphate and the phosphate defect induced the formation of an intermediate level within the forbidden band to allow efficient charge transfer from valence band to conduction band. Moreover, the Bi metal would act as the electron contributor and electron conductor which facilitated the charge carriers separation. Therefore, a new charge transfer pathway can be certified on account of the fact that the covalent loop was evidently generated both at the interface and along with the path of [Bi2O2](2+) -> Bi metal -> PO43- on the Bi@BiPO4. More importantly, the Bi-HBPO-102 with exposure of {102} facet exhibited higher photocatalytic activity than the Bi-MBPO-120 with exposed {120} facet. The {102} facet with the stronger distorted PO4 tetrahedron and the lower potential energy barrier (-17.5eV) contributed to the contacted interface with the more efficient charge transfer, which promoted the generation of active radicals on {102} facet. Additionally, for Bi-HBPO-102, the reaction intermediate NO+ can be observed with in situ DRIFTS, which facilitated the activation of NO via the formation of NO+ to promote the oxidation of NOx into final products. Herein, a new strategy for tailoring the charge transfer pathway was developed to enhance the photocatalytic performance and a new photocatalytic reaction mechanism for photocatalytic NOx removal was proposed. This work could provide new insights into the modification of photocatalysts and mechanistic understanding of the gas-phase photocatalytic reaction mechanism.

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第 106 条，共 321 条

标题: Three-in-One Oxygen Vacancies: Whole Visible-Spectrum Absorption, Efficient Charge Separation, and Surface Site Activation for Robust CO2 Photoreduction

作者: Yu, HJ (Yu, Hongjian); Li, JY (Li, Jieyuan); Zhang, YH (Zhang, Yihe); Yang, SQ (Yang, Songqiu); Han, KL (Han, Keli); Dong, F (Dong, Fan); Ma, TY (Ma, Tianyi); Huang, HW (Huang, Hongwei)

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摘要: A facile and controllable in situ reduction strategy is used to create surface oxygen vacancies (OVs) on Aurivillius-phase Sr2Bi2Nb2TiO12 nanosheets, which were prepared by a mineralizer-assisted soft-chemical method. Introduction of OVs on the surface of Sr2Bi2Nb2TiO12 extends photoresponse to cover the whole visible region and also tremendously promotes separation of photoinduced charge carriers. Adsorption and activation of CO2 molecules on the surface of the catalyst are greatly enhanced. In the gas-solid reaction system without co-catalysts or sacrificial agents, OVs-abundant Sr2Bi2Nb2TiO12 nanosheets show outstanding CO2 photoreduction activity, producing CO with a rate of 17.11 mu mol g(-1) h(-1), about 58 Limes higher than that of the bulk counterpart, surpassing most previously reported state-of-the-art photocatalysts. Our study provides a three-in-one integrated solution to advance the performance of photocatalysts for solar-energy conversion and generation of renewable energy.

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第 107 条，共 321 条

标题: A Practical Privacy-Preserving Data Aggregation (3PDA) Scheme for Smart Grid

作者: Liu, YN (Liu, Yining); Guo, W (Guo, Wei); Fan, CI (Fan, Chun-I); Chang, L (Chang, Liang); Cheng, C (Cheng, Chi)

来源出版物: IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS 卷: 15 期: 3 页: 1767-1774 DOI: 10.1109/TII.2018.2809672 出版年: MAR 2019

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摘要: The real-time electricity consumption data can be used in value-added service such as big data analysis, meanwhile the single user's privacy needs to be protected. How to balance the data utility and the privacy preservation is a vital issue, where the privacy-preserving data aggregation could be a feasible solution. Most of the existing data aggregation schemes rely on a trusted third party (TTP). However, this assumption will have negative impact on reliability, because the system can be easily knocked down by the denial of service attack. In this paper, a practical privacy-preserving data aggregation scheme is proposed without TTP, in which the users with some extent trust construct a virtual aggregation area to mask the single user's data, and meanwhile, the aggregation result almost has no effect for the data utility in large scale applications. The computation cost and communication overhead are reduced in order to promote the practicability. Moreover, the security analysis and the performance evaluation show that the proposed scheme is robust and efficient.

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第 108 条，共 321 条

标题: Microbial Community Responses to Vanadium Distributions in Mining Geological Environments and Bioremediation Assessment

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来源出版物: JOURNAL OF GEOPHYSICAL RESEARCH-BIOGEOSCIENCES 卷: 124 期: 3 页: 601-615 DOI: 10.1029/2018JG004670 出版年: MAR 2019

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摘要: Vanadium mining activities can cause contamination of the surrounding geological environment. Vanadium may exist in multiple matrices due to its migration and transformation, forming interactive relationships; however, the connection between vanadium distributions in multiple matrices and microbial community responses remains largely unknown. Vanadium is a redox-sensitive metal that can be microbiologically reduced and immobilized. To date, bioremediation of vanadium-contaminated environments by indigenous microorganisms has rarely been evaluated. This paper reports a systematic investigation into vanadium distributions and microbial communities in soils, water, and sediment from Panzhihua, China. Large vanadium contents of 1130.19.8mg/kg and 0.130.02mg/L were found in surface soil and groundwater. Vanadium in surface water tended to precipitate. Microbial communities isolated from similar environments were alike due to similarity in matrix chemistry whereas communities were distinct when compared to different matrices, with lower richness and diversity in groundwater. Proteobacteria was distributed widely and dominated microbial communities within groundwater. Redundancy analysis shows that vanadium and nutrients significantly affected metal-tolerant bacteria. Long-term cultivation (240days) suggests the possibility of vanadium bioremediation by indigenous microorganisms, within acid-soluble fraction. This active fraction can potentially release mobile vanadium with shifted redox conditions. Vanadium (V) was bio-reduced to less toxic, mobile vanadium (IV) primarily by enriched Bacillus and Thauera. This study reveals the biogeochemical fate of vanadium in regional geological environments and suggests a bioremediation pathway via native vanadium-reducing microbes.

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第 109 条，共 321 条

标题: Promoted peroxymonosulfate activation into singlet oxygen over perovskite for ofloxacin degradation by controlling the oxygen defect concentration

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来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 359 页: 828-839 DOI: 10.1016/j.cej.2018.11.184 出版年: MAR 1 2019

Web of Science 核心合集中的 "被引频次": 168

被引频次合计: 171

摘要: Recently, perovskite is becoming a promising alternative as peroxymonosulfate (PMS) activator for the remediation of organic pollutants in water. But the factor determining PMS activation efficiency of perovskite and the evolution of reactive oxygen species (ROS) remain equivocal and elusive. In this study, we proposed an oxygen defect dependent PMS activation mechanism over perovskite with the singlet oxygen (O-1(2)) as the dominant ROS. Among the tested four perovskites, ofloxacin (OFX) degradation efficiency increased with the following order: LaFeO3 < LaZnO3 < LaMnO3 < LaNiO3, which agreed well with their oxygen defect amounts based on X-ray photoelectron spectroscopy (XPS) and electron paramagnetic resonance (EPR) analysis. The results clearly demonstrated a good relationship among oxygen defects in LaBO3, OFX degradation efficiency and O-1(2) concentration. Moreover, O-1(2) evolution mechanism over perovskite by decreasing the activation energy of PMS self-decomposition was proposed. The O-1(2) mediated OFX degradation pathway was further studied by HPLC-MS technique and three-dimensional excitation-emission matrix fluorescence spectroscopy (3D EEMs). This work provides a new insight into PMS activation by perovskites and favors its application in actual water treatment.

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第 110 条，共 321 条

标题: Effect of Chinese policies on rare earth supply chain resilience

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来源出版物: RESOURCES CONSERVATION AND RECYCLING 卷: 142 页: 101-112 DOI: 10.1016/j.resconrec.2018.11.017 出版年: MAR 2019

Web of Science 核心合集中的 "被引频次": 165

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摘要: Rare earths elements (REE) are considered as strategic resources because they interact with business and governments' direct policy interventions. Policy interventions can have a major effect on security of rare earth supply (Kooroshy et al., 2015). The purpose of this study is to scrutinize China's REE policies and its impacts on the supply chain resilience. We analyze the supply chain dynamics by specifically targeting a number of Chinese REE policies that have disruptive tendencies. We analyze various policies placing the price at the center as an overarching feedback loop. In other words, we focus on how price responds to various resilience influencing mechanisms such as diversity of supply, regulatory frameworks, and stockpiling. In the process, we investigate Chinese influence on rest of the world (RoW) supply chain and dynamics inside the Chinese supply chain as there are two different layers of supply chain one for China and another one for rest of the world. We show that the supply chain is a complex phenomenon and resilience of a system is not solely dependent on physical disruptions but also on dynamic factors such as societal and geo-political (eg. environmental regulation, speculative market and export ban). We identify links and interdependencies even where data is not readily available and examine how the overall system reacts to various constraints and disruptions.

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第 111 条，共 321 条

标题: Greening in Rural Areas Increases the Surface Urban Heat Island Intensity

作者: Yao, R (Yao, Rui); Wang, LC (Wang, Lunche); Huang, X (Huang, Xin); Gong, W (Gong, Wei); Xia, XG (Xia, Xiangao)

来源出版物: GEOPHYSICAL RESEARCH LETTERS 卷: 46 期: 4 页: 2204-2212 DOI: 10.1029/2018GL081816 出版年: FEB 28 2019

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摘要: In this study, Moderate Resolution Imaging Spectroradiometer land cover, land surface temperature (LST), and enhanced vegetation index (EVI) data were used to investigate the trends of surface urban heat island intensity (SUHII, urban LST minus rural LST) and their relations with vegetation in 397 global big cities during 2001-2017. Major findings include the following: (1) Annual daytime and nighttime SUHII increased significantly (p < 0.05, Mann-Kendall trend test) in 42.1% and 30.5% cities, respectively. (2) The daytime SUHII in the growing season was significantly and positively correlated with rural EVI in 58.9% cities. This is because high rural EVI can increase the EVI difference between urban and rural areas. (3) Rural greening contributed 22.5% of the increased daytime SUHII in the growing season at the global scale. This study highlights that the effect of greening in rural areas was a significant and widespread driver for the increased daytime SUHII.

Plain Language Summary Surface urban heat island (SUHI) refers to higher land surface temperature (LST) in urban than in rural areas. The increased SUHI intensity (urban LST minus rural) was mainly attributed to increased anthropogenic heat emission and built-up areas and reductions in vegetation in urban areas in the literature. However, this study showed that the increased vegetation (i.e., greening) in rural areas was a significant and widespread driver for the increased daytime SUHI intensity around the world during 2001-2017. The implication of this study is that urban LST may increase much faster than rural LST in future global warming.

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第 112 条，共 321 条

标题: Achieving Efficient Incorporation of pi-Electrons into Graphitic Carbon Nitride for Markedly Improved Hydrogen Generation

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摘要: A rapid and highly efficient strategy for introducing C into g-C3N4 involves copolymerizing pi-electron-rich barbituric acid with melamine via a facile microwave-assisted heating, thereby eliminating the issues in conventional electric furnace heating, such as the severe volatilization, owing to the mismatch of the sublimation temperatures of barbituric acid and melamine. The g-C3N4 catalyst after optimizing the C-doping content actively generates increased amounts of H-2 under visible light exposure with the highest H-2 generation rate of 25.0 mu molh(-1), which is nearly 20 times above that using g-C3N4 produced by conventional electric furnace heating of two identical monomers (1.3 mu molh(-1)). As such, the microwave-assisted heating strategy may stand out as an extremely simple route to incorporating pi-electrons into g-C3N4 with markedly improved photocatalytic performance.

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第 113 条，共 321 条

标题: Designing surface-enhanced Raman scattering (SERS) platforms beyond hotspot engineering: emerging opportunities in analyte manipulations and hybrid materials

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摘要: Surface-enhanced Raman scattering (SERS) is a molecule-specific spectroscopic technique with diverse applications in (bio) chemistry, clinical diagnosis and toxin sensing. While hotspot engineering has expedited SERS development, it is still challenging to detect molecules with no specific affinity to plasmonic surfaces. With the aim of improving detection performances, we venture beyond hotspot engineering in this tutorial review and focus on emerging material design strategies to capture and confine analytes near SERS-active surfaces as well as various promising hybrid SERS platforms. We outline five major approaches to enhance SERS performance: (1) enlarging Raman scattering cross-sections of non-resonant molecules via chemical coupling reactions; (2) targeted chemical capturing of analytes through surface-grafted agents to localize them on plasmonic surfaces; (3) physically confining liquid analytes on non-wetting SERS-active surfaces and (4) confining gaseous analytes using porous materials over SERS hotspots; (5) synergizing conventional metal-based SERS platforms with functional materials such as graphene, semiconducting materials, and piezoelectric polymers. These approaches can be integrated with engineered hotspots as a multifaceted strategy to further boost SERS sensitivities that are unachievable using hotspot engineering alone. Finally, we highlight current challenges in this research area and suggest new research directions towards efficient SERS designs critical for real-world applications.

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第 114 条，共 321 条

标题: Organic-matter-rich shales of China

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来源出版物: EARTH-SCIENCE REVIEWS 卷: 189 页: 51-78 DOI: 10.1016/j.earscirev.2018.12.002 出版年: FEB 2019

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被引频次合计: 278

摘要: Organic-matter-rich shales are the main target rocks for unconventional oil and gas exploration and development across the world. In China, shale-gas geological resources are estimated as approximately 110 x 10(12) m(3), with recoverable gas reserves of ca. 20 x 10(12) m(3). Recoverable shale-oil reserves are estimated as ca. 5 x 10(9) t. A total 35 important organic-matter-rich shale units have been recognized from Mesoproterozoic to Cenozoic strata across the entire China. These shales are categorized according to their origin under marine, marine-nonmarine transitional and lacustrine conditions. Shales of marine origin, with ca. 9 x 10(12) m(3) recoverable resources, dominate China's potential in terms of total volume of organic-carbon. Currently, the most favorable marine shales for oil and gas exploration are found in the Sichuan Basin within the lower Cambrian Qiongzhusi Formation and in the Wufeng-Longmaxi formations of uppermost Ordovician through lower Silurian. A fortuitous combination of of sea-level variations, of paleo-productivity, of tectonic activity causing development and migration of partially closed deep basin depocenters, and of sediment accumulation rates controlled the extensive deposition and distribution of organic-matter-rich shales in these Wufeng and Longmaxi formations. Organic-matter-rich shales in marine-nonmarine transitional facies associated with coal measures occur in North China within the Carboniferous and Permian, and in South China within the Permian. These Carboniferous Permian organic-matter-rich shales are important source rocks for the gas fields in the Ordos and Sichuan Basins. Abundant organic-rich shales are also widely distributed within coal-bearing elastics and coal-measure shales of fluvial, lacustrine, and swamp facies in Upper Triassic to Middle Jurassic successions of many basins. Lacustrine organic-rich shales were deposited during the Permian through Neogene in various freshwater to saline lake settings. Lacustrine organic-matter-rich shales are the main oil source rocks in the Songliao, Bohai Bay, Ordos and Junggar basins. Lacustrine algae contributed to the rain of organic matter; and the preservation of organic matter and distribution of organic-rich shale was controlled by lake currents, water depth and oxygen-poor conditions, with enhanced preservation when buried by turbidity currents. Algal blooms were partly induced by trace nutrients from volcanic ash falls in all of these lacustrine basins. Seawater intrusion into the freshwater lake of the Songliao Basin promoted some episodes of black shales. Saline lacustrine basins, such as middle Permian Junggar Basin, contain organic-rich dolomite mudstone that mainly formed during hot climate conditions when the lakes had high salinity and stratified water columns that deprived the bottom waters of oxygen, thereby preserving massive amounts of organic matter. Laminated calcite-rich mudstone in the saline lacustrine settings formed in more brackish waters under stable warm conditions and weak biological activity. The modeling of the factors controlling the distribution of organic-matter-rich shales within China's basins is important for the exploration and development of unconventional oil and gas resources.

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第 115 条，共 321 条

标题: Current status and geological conditions for the applicability of CBM drilling technologies in China: A review

作者: Tao, S (Tao, Shu); Pan, ZJ (Pan, Zhejun); Tang, SL (Tang, Shuling); Chen, SD (Chen, Shida)

来源出版物: INTERNATIONAL JOURNAL OF COAL GEOLOGY 卷: 202 页: 95-108 DOI: 10.1016/j.coal.2018.11.020 出版年: FEB 1 2019

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摘要: Coalbed methane (CBM) drilling technology is critical in achieving efficient CBM development. The geological conditions for CBM development in China are complex, including special terrain, high-rank coal areas, deep coal seams, multiple superposed coal seams and coal measure gas symbiosis areas, steeply inclined coal seam areas, and tectonic coal seam areas. Therefore, it is critical to apply the optimum drilling technology in each different area. This paper first reviews the current CBM drilling technologies and gas production behaviors in China. It is found that although vertical wells and cluster well groups are common well types for CBM development in China, U-, V- and L- shaped horizontal wells and multilateral horizontal wells have been favored for CBM development in recent years. The paper then discusses the applicability of different well types to geological conditions and proposes a modification method for well design in various geologic conditions. This method uses the coal structure, R-o, in situ stress, and ratio of critical desorption pressure to the reservoir pressure as the main inputs.

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第 116 条，共 321 条

标题: In-situ construction of coral-like porous P-doped g-C3N4 tubes with hybrid 1D/2D architecture and high efficient photocatalytic hydrogen evolution

作者: Wu, M (Wu, Mao); Zhang, J (Zhang, Jin); He, BB (He, Bei-bei); Wang, HW (Wang, Huan-wen); Wang, R (Wang, Rui); Gong, YS (Gong, Yan-sheng)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 241 页: 159-166 DOI: 10.1016/j.apcatb.2018.09.037 出版年: FEB 2019

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摘要: Developing novel methods to prepare hollow one-dimensional (1D) carbon nitride (g-C3N4) nanostructure is highly attractive in photocatalytic water splitting for hydrogen production. Herein, a simple, self-assembly synthesis of coral-like 3D porous P-doped g-C3N4 tubes (PCNT) by the combination of pyrolysis and freeze-drying method was reported. Attributed to the integrated merits of 1D tubular structure, 2D nanosheets and phosphorus doping, the as-prepared hollow PCNT exhibits superior photocatalytic activity under visible light irradiation. Owing to their higher specific surface area, enhanced light absorption, and better charge carrier separation and transfer, the maximum apparent photocatalytic hydrogen evolution rate of PCNT is 2020 mu mol g(-1) h(-1), which is about 4.7 folds and 22.4 folds than that of g-C3N4 tubes and pristine bulk g-C3N4, respectively. Moreover, a possible photocatalytic mechanism and nanostructure formation process based on the experimental results are proposed. The novel growth strategy developed here may offer a new avenue for the rational design and synthesis of potentially efficient photocatalyst with 1D/2D integrated nanoarchitecture.

入藏号: WOS:000449444000017

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第 117 条，共 321 条

标题: A Correlation-Based Feature Weighting Filter for Naive Bayes

作者: Jiang, LX (Jiang, Liangxiao); Zhang, LG (Zhang, Lungan); Li, CQ (Li, Chaoqun); Wu, J (Wu, Jia)

来源出版物: IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING 卷: 31 期: 2 页: 201-213 DOI: 10.1109/TKDE.2018.2836440 出版年: FEB 1 2019

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摘要: Due to its simplicity, efficiency, and efficacy, naive Bayes (NB) has continued to be one of the top 10 algorithms in the data mining and machine learning community. Of numerous approaches to alleviating its conditional independence assumption, feature weighting has placed more emphasis on highly predictive features than those that are less predictive. In this paper, we argue that for NB highly predictive features should be highly correlated with the class (maximum mutual relevance), yet uncorrelated with other features (minimum mutual redundancy). Based on this premise, we propose a correlation-based feature weighting (CFW) filter for NB. In CFW, the weight for a feature is a sigmoid transformation of the difference between the feature-class correlation (mutual relevance) and the average feature-feature intercorrelation (average mutual redundancy). Experimental results show that NB with CFW significantly outperforms NB and all the other existing state-of-the-art feature weighting filters used to compare. Compared to feature weighting wrappers for improving NB, the main advantages of CFW are its low computational complexity (no search involved) and the fact that it maintains the simplicity of the final model. Besides, we apply CFW to text classification and have achieved remarkable improvements.

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标题: Utilization of red mud in road base and subgrade materials: A review

作者: Mukiza, E (Mukiza, Emile); Zhang, LL (Zhang, LingLing); Liu, XM (Liu, Xiaoming); Zhang, N (Zhang, Na)

来源出版物: RESOURCES CONSERVATION AND RECYCLING 卷: 141 页: 187-199 DOI: 10.1016/j.resconrec.2018.10.031 出版年: FEB 2019

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摘要: Red mud is highly alkaline slurry produced during alumina extraction from bauxite. Its disposal generates serious environmental pollution. The best way to solve red mud disposal issues is to develop economic utilization technologies that consume significant amounts of red mud. This paper reviews the possibility of utilizing red mud as a road base material, weak subgrade soil stabilizer as well as a subgrade material. Results showed that red mud can be used for those purposes. It was also found that the stabilizing content needed to meet a certain standard differs due to differences in requirements from one country to another. Therefore, there is a need to design proportions with UCS, CBR, leaching characteristics required by the country in which red mud is intended for use. The effect of various stabilizers on performance of red mud is discussed and it transpired that lime showed the best performance followed by dolime fine, ground granulated blast furnace slag, cement kiln dust and fly ash. Findings indicated that red mud shows better performance as a subgrade material than natural soil. Also the synergistic use of red mud and other wastes also improves the mechanical and durability properties of the material compared with using red mud alone. Based on mechanical, economic and environmental benefits, it is recommended to use red mud in road base structure rather than in subgrade despite higher red mud consumption in subgrade than in road base. The scope for future research in this area is also suggested.

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第 119 条，共 321 条

标题: Self-template synthesis of double-shell TiO2@ZIF-8 hollow nanospheres via sonocrystallization with enhanced photocatalytic activities in hydrogen generation

作者: Zhang, M (Zhang, Ming); Shang, QG (Shang, Qigao); Wan, YQ (Wan, Yuqi); Cheng, QR (Cheng, Qingrong); Liao, GY (Liao, Guiying); Pan, ZQ (Pan, Zhiquan)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 241 页: 149-158 DOI: 10.1016/j.apcatb.2018.09.036 出版年: FEB 2019

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摘要: The photocatalytic hydrogen evolution on inorganic semiconductors has been studied for several decades. However, the conversion efficiency of solar energy is still poor caused by the recombination of photo-generated electron-hole pairs. Semiconductors - metal organic frameworks (MOFs) hybrid photocatalysts are being regarded as promising candidates due to large surface area and porosity. Here we reported the coordinative integration of a composite material with efficient capacity of Hy evolution driven by solar light, namely TiO2@ZIF8, made up of titanium dioxide hollow nanospheres (TiO(2)HNPs) externally decorated with zeolitic imidazolate framework-8 (ZIF-8) via a facile sonochemical route. The resulting composite demonstrates the high dispersion of ZIF-8 on the surface of TiO2 HNPs and this kind of close connection makes for an efficient photocatalyst through the synergistic effect. Up to 50.89% of apparent quantum efficiency (AQE), the hybrid double-shell HNPs exhibits 3.5 times higher H-2 evolution rate (HER) than the bare TiO2 HNPs under solar light and shows good stability and recyclability. It is further proposed by photoluminescence spectra and optoelectronic measurement that the remarkably enhanced photocatalytic activity of TiO2@ZIF-8 is not only attributed to the efficient charge separation with electron injection from ZIF-8 to TiO(2)HNPs, but also more active reaction sites provided by cavity structure of ZIF-8. Overall, this work exemplifies that surface engineering of semiconductors with MOFs is a great strategy to achieve advanced photocatalytic performance for solar energy conversion.

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第 120 条，共 321 条

标题: New strategy for designing orangish-redemitting phosphor via oxygen-vacancy-induced electronic localization

作者: Wei, Y (Wei, Yi); Xing, GC (Xing, Gongcheng); Liu, K (Liu, Kang); Li, GG (Li, Guogang); Dang, PP (Dang, Peipei); Liang, SS (Liang, Sisi); Liu, M (Liu, Min); Cheng, ZY (Cheng, Ziyong); Jin, DY (Jin, Dayong); Lin, J (Lin, Jun)

来源出版物: LIGHT-SCIENCE & APPLICATIONS 卷: 8 文献号: 15 DOI: 10.1038/s41377-019-0126-1 出版年: JAN 30 2019

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摘要: Phosphor-converted white-light-emitting diodes (pc-WLED) have been extensively employed as solid-state lighting sources, which have a very important role in people's daily lives. However, due to the scarcity of the red component, it is difficult to realize warm white light efficiently. Hence, red-emitting phosphors are urgently required for improving the illumination quality. In this work, we develop a novel orangish-red La4GeO8:Bi3+ phosphor, the emission peak of which is located at 600 nm under near-ultraviolet (n-UV) light excitation. The full width at half maximum (fwhm) is 103 nm, the internal quantum efficiency (IQE) exceeds 88%, and the external quantum efficiency (EQE) is 69%. According to Rietveld refinement analysis and density functional theory (DFT) calculations, Bi3+ ions randomly occupy all La sites in orthorhombic La4GeO8. Importantly, the oxygen-vacancy-induced electronic localization around the Bi3+ ions is the main reason for the highly efficient orangish-red luminescence. These results provide a new perspective and insight from the local electron structure for designing inorganic phosphor materials that realize the unique luminescence performance of Bi3+ ions.

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第 121 条，共 321 条

标题: The Kobresia pygmaea ecosystem of the Tibetan highlands - Origin, functioning and degradation of the world's largest pastoral alpine ecosystem Kobresia pastures of Tibet

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摘要: With 450,000 km(2) Kobresia (syn. Carex) pygmaea dominated pastures in the eastern Tibetan highlands are the world's largest pastoral alpine ecosystemforming a durable turf cover at 3000-6000 m a.s.l. Kobresia's resilience and competitiveness is based on dwarf habit, predominantly below-ground allocation of photo assimilates, mixture of seed production and clonal growth, and high genetic diversity. Kobresia growth is co-limited by livestock-mediated nutrient withdrawal and, in the drier parts of the plateau, low rainfall during the short and cold growing season. Overstocking has caused pasture degradation and soil deterioration over most parts of the Tibetan highlands and is the basis for this man-made ecosystem. Natural autocyclic processes of turf destruction and soil erosion are initiated through polygonal turf cover cracking, and accelerated by soil-dwelling endemic small mammals in the absence of predators. The major consequences of vegetation cover deterioration include the release of large amounts of C, earlier diurnal formation of clouds, and decreased surface temperatures. These effects decrease the recovery potential of Kobresia pastures and make them more vulnerable to anthropogenic pressure and climate change. Traditional migratory rangeland management was sustainable over millennia, and possibly still offers the best strategy to conserve and possibly increase C stocks in the Kobresia turf. (C) 2018 The Authors. Published by Elsevier B.V.

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标题: Overview of recent advances in stability of linear systems with time-varying delays

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摘要: This study provides an overview and in-depth analysis of recent advances in stability of linear systems with time-varying delays. First, recent developments of a delay convex analysis approach, a reciprocally convex approach and the construction of Lyapunov-Krasovskii functionals are reviewed insightfully. Second, in-depth analysis of the Bessel-Legendre inequality and some affine integral inequalities is made, and recent stability results are also summarised, including stability criteria for three cases of a time-varying delay, where information on the bounds of the time-varying delay and its derivative is totally known, partly known and completely unknown, respectively. Third, a number of stability criteria are developed for the above three cases of the time-varying delay by employing canonical Bessel-Legendre inequalities, together with augmented Lyapunov-Krasovskii functionals. It is shown through numerical examples that these stability criteria outperform some existing results. Finally, several challenging issues are pointed out to direct the near future research.

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标题: Sampled-data-based dissipative control of T-S fuzzy systems

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摘要: This paper investigates the problem of sampled-data-based dissipative control of Takagi-Sugeno (T-S) fuzzy systems. The sampling period is assumed to be varying within an interval. By making full use of realistic information about the whole sampling interval, we propose a novel complete sampling-interval-dependent looped function, which depends not only on the interval from x(t) to x(t(k)) but also on the interval from x(t) to x(t(k+1)). Based on this function, a sufficient condition is established, ensuring the considered system strictly (Q, S, R) - gamma-dissipative. Furthermore, a approach to design desired sampled-data controllers is proposed. It is applied to solve the problems of a truck-trailer and an inverted pendulum. From the results obtained, we see that this approach is highly effective. (C) 2018 Elsevier Inc. All rights reserved.

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标题: Permian integrative stratigraphy and timescale of China

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摘要: A series of global major geological and biological events occurred during the Permian Period. Establishing a highresolution stratigraphic and temporal framework is essential to understand their cause-effect relationship. The official International timescale of the Permian System consists of three series (i.e., Cisuralian, Guadalupian and Lopingian in ascending order) and nine stages. In China, the Permian System is composed of three series (Chuanshanian, Yansingian and Lopingian) and eight stages, of which the subdivisions and definitions of the Chuanshanian and Yangsingian series are very different from the Cisuralian and Guadalupian series. The Permian Period spanned approximate to 47 Myr. Its base is defined by the First Appearance Datum (FAD) of the conodont Streptognathodus isolatus at Aidaralash, Kazakhstan with an interpolated absolute age 298.9 +/- 0.15 Ma at Usolka, southern Urals, Russia. Its top equals the base of the Triassic System and is defined by the FAD of the conodont Hindeodus parvus at Meishan D section, southeast China with an interpolated absolute age 251.902 +/- 0.024 Ma. Thirty-five conodont, 23 fusulinid, 17 radiolarian and 20 ammonoid zones are established for the Permian in China, of which the Guadalupian and Lopingian conodont zones have been served as the standard for international correlation. The Permian C-13(carb) trend indicates that it is characterized by a rapid negative shift of 3-5 parts per thousand at the end of the Changhsingian, which can be used for global correlation of the end-Permian mass extinction interval, but C-13(carb) records from all other intervals may have more or less suffered subsequent diagenetic alteration or represented regional or local signatures only. Permian O-18{ainpatite} studies suggest that an icehouse stage dominated the time interval from the late Carboniferous to Kungurian (late Cisuralian). However, paleoclimate began to ameriolate during the late Kungurian and gradually shifted into a greenhouse-dominated stage during the Guadalupian. The Changhsingian was a relatively cool stage, followed by a globally-recognizable rapid temperature rise of 8-10 degrees C at the very end of the Changhsingian. The Sr-87/Sr-86 ratio trend shows that their values at the beginning of the Permian were between 0.70800, then gradually decreased to the late Capitanian minimum 0.70680-0.70690, followed by a persistent increase until the end of the Permian with the value 0.70708. Magenetostratigraphy suggests two distinct stages separated by the Illawarra Reversal in the middle Wordian, of which the lower is the reverse polarity Kiaman Superchron and the upper is the mixed-polarity Illawarra Superchron. The end-Guadalupian (or pre-Lopingian) biological crisis occurred during the late Capitanian, when faunal changeovers of different fossil groups had different paces, but generally experienced a relatively long time from the Jinogondolella altudensis Zone until the earliest Wuchiapingian. The end-Permian mass extinction was a catastrophic event that is best constrained at the Meishan section, which occurred at 251.941 +/- 0.037 Ma and persisted no more than 61 +/- 48 kyr. After the major pulse at Bed 25, the extinction patterns are displayed differently in different sections. The global end-Guadalupian regression is manifested between the conodont Jinogondolella xuanhanensis and Clarkina dukouensis zones and the end-Changhsingian transgression began in the Hindeodus changxingensis-Clarkina zhejiangensis Zone.

The Permian Period is also characterized by strong faunal provincialism in general, which resulted in difficulties in inter-continental and inter-regional correlation of both marine and terrestrial systems.

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标题: Satellite Remote Sensing of Surface Urban Heat Islands: Progress, Challenges, and Perspectives

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摘要: The surface urban heat island (SUHI), which represents the difference of land surface temperature (LST) in urban relativity to neighboring non-urban surfaces, is usually measured using satellite LST data. Over the last few decades, advancements of remote sensing along with spatial science have considerably increased the number and quality of SUHI studies that form the major body of the urban heat island (UHI) literature. This paper provides a systematic review of satellite-based SUHI studies, from their origin in 1972 to the present. We find an exponentially increasing trend of SUHI research since 2005, with clear preferences for geographic areas, time of day, seasons, research foci, and platforms/sensors. The most frequently studied region and time period of research are China and summer daytime, respectively. Nearly two-thirds of the studies focus on the SUHI/LST variability at a local scale. The Landsat Thematic Mapper (TM)/Enhanced Thematic Mapper (ETM+)/Thermal Infrared Sensor (TIRS) and Terra/Aqua Moderate Resolution Imaging Spectroradiometer (MODIS) are the two most commonly-used satellite sensors and account for about 78% of the total publications. We systematically reviewed the main satellite/sensors, methods, key findings, and challenges of the SUHI research. Previous studies confirm that the large spatial (local to global scales) and temporal (diurnal, seasonal, and inter-annual) variations of SUHI are contributed by a variety of factors such as impervious surface area, vegetation cover, landscape structure, albedo, and climate. However, applications of SUHI research are largely impeded by a series of data and methodological limitations. Lastly, we propose key potential directions and opportunities for future efforts. Besides improving the quality and quantity of LST data, more attention should be focused on understudied regions/cities, methods to examine SUHI intensity, inter-annual variability and long-term trends of SUHI, scaling issues of SUHI, the relationship between surface and subsurface UHIs, and the integration of remote sensing with field observations and numeric modeling.

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标题: A high-performance Bi2O3/Bi2SiO5 p-n heterojunction photocatalyst induced by phase transition of Bi2O3

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摘要: In this work, Bi2O3/Bi2SiO5 p-n heterojunction photocatalyst was successfully fabricated via a facile one-step synthesis using Bi(NO3)(3) and nano-SiO2 as precursors. With the increasing amount of SiO2, alpha-Bi2O3 gradually transferred into beta-Bi2O3, and Bi2O3/Bi2SiO5 p-n heterojunction was obtained at the same time. The as-prepared samples were systematically characterized by XRD, scanning electron microscopy (SEM), energy-dispersive spectrometry (EDS), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), UV-vis diffuse reflectance spectroscopy (DRS). The Bi2O3/Bi2SiO5 heterojunction photocatalysts exhibited higher photocatalytic activity than alpha-Bi2O3 on the degradation of organic pollutants under simulated sunlight irradiation. The enhanced photocatalytic activity could be ascribed to the larger specific surface area, the larger contact angle, the formation of beta-Bi2O3 and construction of p-n heterojunction. More importantly, the phase transition mechanism of Bi2O3 in Bi2O3/Bi2SiO5 heterojunction photocatalyst was proposed, which is significant for the theoretical study and application of photocatalytic materials.

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标题: Neoproterozoic magmatism in the western and northern margins of the Yangtze Block (South China) controlled by slab subduction and subduction-transform-edge-propagator

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摘要: The South China Craton consists of the Yangtze and Cathaysia blocks that were welded together along the Jiangnan Fold Belt in the Neoproterozoic. The Neoproterozoic magmatism in the western and northern margins of the Yangtze Block is characterized by voluminous volcano-sedimentary strata, numerous felsic intrusions and many mafic-ultramafic plutons which provide a good opportunity to examine the geodynamics and tectonic evolution of the South China Craton during the assembly and breakup of Rodinia. Based on the geochronological and geochemical data, our study shows that the Neoproterozoic igneous rocks in the western and northern margins of the Yangtze Block were formed in subduction- and rift-related tectonic settings, respectively.

In the western margin of the Yangtze Block, the Neoproterozoic mafic and ultramafic rocks show arc-affinity trace elemental compositions that are indicative of mantle sources enriched by slab fluids. High-delta O-18 mafic rocks (850-780 Ma) were derived from mantle wedges that were modified by sediment melts, whereas low-delta O-18 mafic rocks (750-740 Ma) were formed by partial melting of mantle sources further enriched by altered oceanic crust melts. The widespread talc-alkaline I-type granitoids in this region, generated between 870 and 750 Ma, show negative to positive whole rock eNd (- 4.9 to + 4.8) and variable zircon eHf values (- 1.9 to + 10.6), similar to those of the contemporary mafic-ultramafic rocks, suggesting that they were produced by melting of the juvenile crust. The 780-750 Ma adakitic granitoids are characterized by high Sr/Y (19-318) and low Y (1.78-17.9 ppm) and have relatively constant eNd (- 2.1 to + 2.9) and eHf ( + 4.3 to + 7.1) and mantle-like 8180 values (3.40 parts per thousand to 6.86 parts per thousand), suggesting that they were partial melts of a subducted oceanic slab. These three types of igneous rocks demonstrate that the Neoproterozoic magmatism in the western margin of the Yangtze Block was controlled by a continuous subduction system.

However, Neoproterozoic magmatism in the South Qinling Belt at the northern margin of the Yangtze Block generated both arc- and rift-related igneous rocks. The arc-like mafic-ultramafic rocks are thought to have been derived from a subduction-modified lithospheric mantle source, whereas the MORB-affinity mafic rocks were probably sourced from an asthenosphere mantle. Associated Neoproterozoic granitoids were produced by melting of the juvenile mafic crust, except minor felsic rocks derived from the ancient basement. Widespread 800-700 Ma volcano-sedimentary sequences and 650 Ma mafic dike swarms suggest an extensional environment. Neoproterozoic magmatic zircons from felsic volcanic rocks and HP/UHP metamorphic rocks preserve low-delta O-18 values that were inherited from their protolith which underwent high temperature hydrothermal interaction in a rift setting. On the basis of these observations, the Neoproterozoic magmatism in the South Qinling Belt is proposed to have been controlled by a subduction-transform edge propagator (STEP) in relation to the continuous subduction system at the western margin of the Yangtze Block.

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第 128 条，共 321 条

标题: Mini-UAV-Borne Hyperspectral Remote Sensing From observation and processing to applications

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第 129 条，共 321 条

标题: Thickness-Dependent Facet Junction Control of Layered BiOIO3 Single Crystals for Highly Efficient CO2 Photoreduction

作者: Chen, F (Chen, Fang); Huang, HW (Huang, Hongwei); Ye, LQ (Ye, Liqun); Zhang, TR (Zhang, Tierui); Zhang, YH (Zhang, Yihe); Han, XP (Han, Xiaopeng); Ma, TY (Ma, Tianyi)

来源出版物: ADVANCED FUNCTIONAL MATERIALS 卷: 28 期: 46 文献号: 1804284 DOI: 10.1002/adfm.201804284 出版年: NOV 14 2018

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摘要: Thin layer fabrication and crystal facet engineering favor the prompt charge transfer from bulk to the surface of a material and spatial charge separation among different facets, tremendously benefitting photocatalytic activity. However, the thickness and surface facet composition are considered as two entwined characteristics of layered materials with well-defined and tunable shapes, which possess great promise to achieve the simultaneous manipulation of charge transfer and spatial separation. Herein, it is demonstrated that one solution for the aforementioned issue by controllably regulating the surface {010}/{100} facet junctions of a layered thickness-tunable bismuth-based material, BiOIO3. The attenuation in thickness of BiOIO3 nanoplates shortens the diffusion pathway of charge carriers, and more importantly the tuning of nanolayer thickness renders the ratio variation of the top {010} facet to the lateral {100} facet, which dominates the spatial separation of photogenerated electrons and holes. As a result, the highest CO evolution rate from CO2 reduction over BiOIO3 nanoplates with the optimal thickness and ratio of exposed facets reaches 5.42 mu mol g(-1) h(-1), over 300% that of the bulk counterpart (1.77 mu mol g(-1) h(-1)). This work paves a new way for governing charge movement behaviors on the basis of the synergistic engineering of layer structure and exposing facets.

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第 130 条，共 321 条

标题: Palladium Phosphide as a Stable and Efficient Electrocatalyst for Overall Water Splitting

作者: Luo, F (Luo, Fang); Zhang, Q (Zhang, Quan); Yu, XX (Yu, Xinxin); Xiao, SL (Xiao, Shenglin); Ling, Y (Ling, Ying); Hu, H (Hu, Hao); Guo, L (Guo, Long); Yang, ZH (Yang, Zehui); Huang, L (Huang, Liang); Cai, WW (Cai, Weiwei); Cheng, HS (Cheng, Hansong)

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摘要: A palladium phosphide electrocatalyst supported on carbon black (PdP2@CB) shows efficient water splitting in both alkaline and neutral electrolytes. Significantly lower overpotentials are required for PdP2@CB (27.5 mV in 0.5 m H2SO4; 35.4 mV in 1m KOH; 84.6 mV in 1 m PBS) to achieve a HER electrocatalytic current density of 10mAcm(-2) compared to commercial Pt/CB (30.1 mV in 0.5 m H2SO4; 46.6 mV in 1 m KOH; 122.7 mV in 1 m PBS). Moreover, no loss in HER activity is detectable after 5000 potential sweeps. Only 270 mV and 277 mV overpotentials are required to reach a current density of 10mAcm(-2) for PdP2@CB to catalyze OER in 1m KOH and 1m PBS electrolytes, which is better OER activity than the benchmark IrO2 electrocatalyst (301 mV and 313 mV to drive a current density of 10 mA cm(-2)). 1.59V and 1.72 V are needed for PdP2@CB to achieve stable water splitting catalytic current density of 10mAcm(-2) in 1m PBS and 50 mA cm(-2) in 1m KOH for 10 h, respectively.

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第 131 条，共 321 条

标题: East Asian hydroclimate modulated by the position of the westerlies during Termination I

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摘要: Speleothem oxygen isotope records have revolutionized our understanding of the paleo East Asian monsoon, yet there is fundamental disagreement on what they represent in terms of the hydroclimate changes. We report a multiproxy speleothem record of monsoon evolution during the last deglaciation from the middle Yangtze region, which indicates a wetter central eastern China during North Atlantic cooling episodes, despite the oxygen isotopic record suggesting a weaker monsoon. We show that this apparent contradiction can be resolved if the changes are interpreted as a lengthening of the Meiyu rains and shortened post-Meiyu stage, in accordance with a recent hypothesis. Model simulations support this interpretation and further reveal the role of the westerlies in communicating the North Atlantic influence to the East Asian climate.

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第 132 条，共 321 条

标题: Closure of the East Paleotethyan Ocean and amalgamation of the Eastern Cimmerian and Southeast Asia continental fragments

作者: Wang, YJ (Wang, Yuejun); Qian, X (Qian, Xin); Cawood, PA (Cawood, Peter A.); Liu, HC (Liu, Huichuan); Feng, QL (Feng, Qinglai); Zhao, GC (Zhao, Guochun); Zhang, YH (Zhang, Yanhua); He, HY (He, Huiying); Zhang, PZ (Zhang, Peizhen)

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摘要: The Phanerozoic record of Southeast Asia preserves the history of opening and subsequent consumption of the Paleotethyan Ocean and the assembly of continental fragments into Asia as part of the broader-scale reconstruction of Pangea. However, uncertainty remains as to which of the many suture zones in Southeast Asia represents the relict of the main ocean, when final ocean closure occurred, and the assembly history of the Eastern Cimmerian and Southeast Asia continental fragments. Our overview of the geological features of the suture zones, the bounding continental fragments and their magmatic, metamorphic and sedimentary records resolves many of these key issues. The sedimentary, biogeographical, structural, lithological, geochemical and geochronological data from the Changning-Menglian, Inthanon and Bentong-Raub suture zones argue for their linkage with the Longmu Co-Shuanghu suture zone in Central Tibet, and together constitute the main East Paleotethyan Ocean relict. The eastward subduction of the ocean resulted in the development of a series of magmatic arc-back-arc basin and continental fragments in Southeast Asia, including, from west to east, the Lincang-Sukhothai-East Malaya arc, the Jinghong-Nan-Sa Kaeo back-arc basin, the Simao/west Indochina fragment, the Luang Prabang-Loei back-arc basin, the south Indochina fragment, the Wusu and Truong Son back arc basins, the north Indochina fragment, the Jinshajiang-Ailaoshan-Song Ma branch/back-arc basin and the South China Block. Assembly of these fragments resulted in Indosinian high temperature and high pressure metamorphism and related tectonothermal event. Available data indicate a switch from subduction of the main East Paleotethyan Ocean to the collision of the Sibumasu with Simao/Indochina blocks at similar to 237 Ma, with subsequent syn- and post-collisional events at similar to 237-230 Ma and similar to 230-200 Ma, respectively, along the Changning-Menglian, Inthanon and Bentong-Raub suture zones. The timing of initial-, syn- and post-collision events along the Jinshajiang-Ailaoshan-Song Ma suture zone with its record of back-arc basin closure is at similar to 247 Ma, similar to 247-237 Ma and similar to 237-200 Ma, generally similar to 10 Ma older than that along the Changning-Menglian, Inthanon and Bentong-Raub suture zones. Our synthesis of all available data enables establishment of a comprehensive geodynamic model for the East Paleotethyan evolution. This model links the spatial-temporal pattern across Southeast Asia into a series of tectonic events including ocean/back-arc basin opening, subduction/closure, subsequent assemblage and orogenic collapse, along with associated igneous, metamorphic and sedimentary activities.

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标题: Rational design of phosphorescent iridium(III) complexes for emission color tunability and their applications in OLEDs

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摘要: This review is an update on recent developments in emissive iridium(III) phosphorescent complexes and their applications in organic light-emitting diodes (OLEDs). The emphasis is focused on complexes with emission colors spanning the whole visible spectral region, which is extremely important for applications of OLEDs in display and white-light luminance. In each color section, materials are classified according to their coordination configuration, including homoleptic, heteroleptic and tridentate, trying to clarify the relationship between the molecular structure and the photophysical properties. Since the emission color, photoluminescence efficiency and carrier mobility of the phosphors are critical for device performances, we endeavor to dig out these values along with the measuring methods from the publications, and rational chemical modifications aiming for high efficiency and carrier mobility with different colors are also discussed. (C) 2018 Elsevier B.V. All rights reserved.

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第 134 条，共 321 条

标题: Reconstructing South China in Phanerozoic and Precambrian supercontinents

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摘要: The history of the South China Craton and the constituent Yangtze and Cathaysia blocks are directly linked to Earth's Phanerozoic and Precambrian record of supercontinent assembly and dispersal. Exposed Archean rocks are limited to isolated fragments in the Yangtze Block that preserve a record of Meso- to Neo-Archean magmatism, sedimentation and metamorphism associated with a period of global craton formation and stabilization that corresponds with the assembly of the Kenor supercontinent/supercraton. However, there are insufficient data to link its history with other similar aged cratons. The tectonostratigraphic record in South China in the Paleoproterozoic, corresponding with the assembly of Nuna, suggests that rock units in the Yangtze Block were spatially linked with northwestern Laurentia and possibly Siberia, whereas Cathaysia was joined to northern India. During the formation of Rodinia at the end of the Mesoproterozoic through to that of Pangea in the mid-Paleozoic, Cathaysia remained joined to northern India. Early Neoproterozoic supra-subduction zone magmatic arc-back arc assemblages ranging in age from similar to 1000 Ma to 810 Ma occur within Cathaysia, along its northwestern margin, and along the southeastern margin of the Yangtze Block. These rocks provide a record of convergent plate interaction, which continued along the western margin of the Yangtze Block until around 700 Ma and correlates with similar along strike subduction zone magmatism in northwest India, Seychelles and Madagascar. During the final assembly of Gondwana in the early Paleozoic suturing of India-South China with the Western Australia-Mawson blocks along the Kuunga Orogen resulted in the accretion of the Sanya Block of Hainan Island with the rest of Cathaysia. The accretion of Laurussia to Gondwana in the mid-Paleozoic to form Pangea corresponds with the initiation of lithospheric extension along the northern margin of Gondwana and the separation of a number of continental blocks, including South China, which then drifted northward across the Paleo-Tethys to collide with the Asian segment of Pangea in the Permo-Triassic.

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标题: A semi-supervised generative framework with deep learning features for high-resolution remote sensing image scene classification

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摘要: High resolution remote sensing (HRRS) image scene classification plays a crucial role in a wide range of applications and has been receiving significant attention. Recently, remarkable efforts have been made to develop a variety of approaches for HRRS scene classification, wherein deep-learning-based methods have achieved considerable performance in comparison with state-of-the-art methods. However, the deep-learning-based methods have faced a severe limitation that a great number of manually annotated HRRS samples are needed to obtain a reliable model. However, there are still not sufficient annotation datasets in the field of remote sensing. In addition, it is a challenge to get a large scale HRRS image dataset due to the abundant diversities and variations in HRRS images. In order to address the problem, we propose a semi-supervised generative framework (SSGF), which combines the deep learning features, a self-label technique, and a discriminative evaluation method to complete the task of scene classification and annotating datasets. On this basis, we further develop an extended algorithm (SSGA-E) and evaluate it by exclusive experiments. The experimental results show that the SSGA-E outperforms most of the fully-supervised methods and semi-supervised methods. It has achieved the third best accuracy on the UCM dataset, the second best accuracy on the WHU-RS, the NWPU-RESISC45, and the AID datasets. The impressive results demonstrate that the proposed SSGF and the extended method is effective to solve the problem of lacking an annotated HRRS dataset, which can learn valuable information from unlabeled samples to improve classification ability and obtain a reliable annotation dataset for supervised learning. (C) 2017 International Society for Photogrammetry and Remote Sensing, Inc. (ISPRS). Published by Elsevier B.V. All rights reserved.

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标题: Rapid transition from continental breakup to igneous oceanic crust in the South China Sea

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摘要: Continental breakup represents the successful process of rifting and thinning of the continental lithosphere, leading to plate rupture and initiation of oceanic crust formation. Magmatism during breakup seems to follow a path of either excessive, transient magmatism (magma-rich margins) or of igneous starvation (magma-poor margins). The latter type is characterized by extreme continental lithospheric extension and mantle exhumation prior to igneous oceanic crust formation. Discovery of magma-poor margins has raised fundamental questions about the onset of ocean-floor type magmatism, and has guided interpretation of seismic data across many rifted margins, including the highly extended northern South China Sea margin. Here we report International Ocean Discovery Program drilling data from the northern South China Sea margin, testing the magma-poor margin model outside the North Atlantic. Contrary to expectations, results show initiation of Mid-Ocean Ridge basalt type magmatism during breakup, with a narrow and rapid transition into igneous oceanic crust. Coring and seismic data suggest that fast lithospheric extension without mantle exhumation generated a margin structure between the two endmembers. Asthenospheric upwelling yielding Mid-Ocean Ridge basalt-type magmatism from normal-temperature mantle during final breakup is interpreted to reflect rapid rifting within thin pre-rift lithosphere.

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标题: Fe, Cu-Coordinated ZIF-Derived Carbon Framework for Efficient Oxygen Reduction Reaction and Zinc-Air Batteries

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摘要: Zeolitic imidazole frameworks (ZIFs) offer rich platforms for rational design and construction of high-performance nonprecious-metal oxygen reduction reaction (ORR) catalysts owing to their flexibility, hierarchical porous structures, and high surface area. Herein, an Fe, Cu-coordinated ZIF-derived carbon framework (Cu@Fe-N-C) with a well-defined morphology of truncated rhombic dodecahedron is facilely prepared by introducing Fe2+ and Cu2+ during the growth of ZIF-8, followed by pyrolysis. The obtained Cu@Fe-N-C, with bimetallic active sites, large surface area, high nitrogen doping level, and conductive carbon frameworks, exhibits excellent ORR performance. It displays 50 mV higher half-wave potential (0.892 V) than that of Pt catalysts in an alkaline medium and comparable performance to Pt catalysts in an acidic medium. In addition, it also has excellent durability and methanol resistance ability in both acidic and alkaline solutions, which makes it one of the best Pt-free catalysts reported to date for ORR. Impressively, when being employed as a cathode catalyst in zinc-air batteries, Cu@Fe-N-C presents a higher peak power density of 92 mW cm(-2) than that of Pt/C (74 mW cm(-2)) as well as excellent durability.

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标题: All-inorganic perovskite nanocrystal scintillators

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摘要: The rising demand for radiation detection materials in many applications has led to extensive research on scintillators(1-3). The ability of a scintillator to absorb high-energy (kiloelectronvolt-scale) X-ray photons and convert the absorbed energy into low-energy visible photons is critical for applications in radiation exposure monitoring, security inspection, X-ray astronomy and medical radiography(4,5). However, conventional scintillators are generally synthesized by crystallization at a high temperature and their radioluminescence is difficult to tune across the visible spectrum. Here we describe experimental investigations of a series of all-inorganic perovskite nanocrystals comprising caesium and lead atoms and their response to X-ray irradiation. These nanocrystal scintillators exhibit strong X-ray absorption and intense radioluminescence at visible wavelengths. Unlike bulk inorganic scintillators, these perovskite nanomaterials are solution-processable at a relatively low temperature and can generate X-ray-induced emissions that are easily tunable across the visible spectrum by tailoring the anionic component of colloidal precursors during their synthesis. These features allow the fabrication of flexible and highly sensitive X-ray detectors with a detection limit of 13 nanograys per second, which is about 400 times lower than typical medical imaging doses. We show that these colour-tunable perovskite nanocrystal scintillators can provide a convenient visualization tool for X-ray radiography, as the associated image can be directly recorded by standard digital cameras. We also demonstrate their direct integration with commercial flat-panel imagers and their utility in examining electronic circuit boards under low-dose X-ray illumination.

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标题: Delineating multi-scenario urban growth boundaries with a CA-based FLUS model and morphological method

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摘要: Urban growth boundaries (UGBs) have been commonly regarded as a useful tool for controlling urban sprawl. There is a need to create models that can establish plausible UGBs for fast growing regions. Previous methods have merely focused on establishing a single UGB scenario over different time intervals, but rarely considered the influences of macro policy (e.g., future urban demand) and spatial policy (e.g., master plan) for regional planning. However, the spatial patterns of urban expansion are significantly affected by regional planning. In this paper, a CA-based method called the future land use simulation (FLUS) is applied to the delineation of UGBs. We argue that the delineation needs to integrate the top-down approach with CA for projecting complex land use changes under designed scenarios. The system dynamics model (SD) and cellular automaton model (CA) were interactively coupled in the FLUS model during the projection period. The top-down SD is used to project scenarios that relate to macro policy and socioeconomic status, and the bottom-up CA accounts for urban growth simulations under the influence of different driving factors and spatial planning policies. A morphological technology based on erosion and dilation is further proposed to generate the UGBs from the FLUS model's simulated urban forms. The proposed UGB-FLUS model was applied to the establishment of UGBs in the Pearl River Delta region (PRD) from 2020 to 2050. The results demonstrate that the method can support urban planning by generating feasible patterns for UGBs under different planning scenarios.

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标题: Road Extraction from High-Resolution Remote Sensing Imagery Using Deep Learning

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摘要: The road network plays an important role in the modern traffic system; as development occurs, the road structure changes frequently. Owing to the advancements in the field of high-resolution remote sensing, and the success of semantic segmentation success using deep learning in computer version, extracting the road network from high-resolution remote sensing imagery is becoming increasingly popular, and has become a new tool to update the geospatial database. Considering that the training dataset of the deep convolutional neural network will be clipped to a fixed size, which lead to the roads run through each sample, and that different kinds of road types have different widths, this work provides a segmentation model that was designed based on densely connected convolutional networks (DenseNet) and introduces the local and global attention units. The aim of this work is to propose a novel road extraction method that can efficiently extract the road network from remote sensing imagery with local and global information. A dataset from Google Earth was used to validate the method, and experiments showed that the proposed deep convolutional neural network can extract the road network accurately and effectively. This method also achieves a harmonic mean of precision and recall higher than other machine learning and deep learning methods.

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标题: One-step synthesis of nanostructured g-C3N4/TiO2 composite for highly enhanced visible-light photocatalytic H-2 evolution

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摘要: Improving the photocatalytic property of g-C3N4 by combined strategies has attracted increasing attention recently. In this work, we realized the structure nanosizing of g-C3N4 and its synchronous compounding with TiO2 nanoparticles in one step, using a facile melamine-involved vapor deposition method coupled with a simple and easy setup. Nanostructured g-C3N4/TiO2 heterojunction was well-established and the resultant nanocomposite demonstrated an excellent visible-light photocatalytic H-2 evolution performance 10.8 times higher than that of bulk g-C3N4. The structure nanosizing coupled with the heterojunction construction contributed together to the improvement of photoinduced electron-hole separation and final photocatalytic efficiency. The proposed simple method and setup have the potential to be used for preparing other g-C3N4-based nanocomposites with advanced photocatalytic properties.

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标题: Transition metal catalyzed sulfite auto-oxidation systems for oxidative decontamination in waters: A state-of-the-art minireview

作者: Zhou, DN (Zhou, Danna); Chen, L (Chen, Long); Li, JJ (Li, Jinjun); Wu, F (Wu, Feng)

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摘要: Sulfate radical (SO4 (.-)) is believed to be one of the most highly reactive oxidants, as superior as hydroxyl radical (HO.), for various organic/inorganic contaminants removal in the field of pollution control chemistry. In the recent decade, sulfate radical-based advanced oxidation processes (SR-AOPs) have been developed quickly primarily due to the selective oxidation and high oxidative potential and therefore hold great promises. Although peroxydisulfate (PDS) and peroxymonosulfate (PMS) have been extensively utilized in various SR-AOPs, new attempts have been made to replace PDS/PMS with sulfite for the purpose of SO4.- generation at lower cost. Indeed, some significant progresses have been achieved in driving SO4.- generation from transient metal catalyzed sulfite auto-oxidation systems to oxidize contaminants. The background, basic mechanisms, and application of the transition metal catalyzed sulfite auto-oxidation systems in contaminants detoxification and microorganism inactivation are reviewed in this work. Meanwhile, we hereby also want to point out several important unresolved issues for future investigation. (1) How to realize quick reactions at near neutral pH? (2) How to achieve high rate of mineralization as equally as or at least close to the apparent complete elimination of substrates? (3) What are the relative contributions of various oxysulfur radicals to the transformation of contaminants. (4) Is it possible to control the extent of substrates oxidation so as to get target transformed products with desired properties? If so, SR-AOPs can be upgraded as product-oriented AOPs (PO-AOPs). This state-of-art minireview aims to discuss abovementioned issues and presents some recent progresses in this field.

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标题: Characterizations of full-scale pore size distribution, porosity and permeability of coals: A novel methodology by nuclear magnetic resonance and fractal analysis theory

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来源出版物: INTERNATIONAL JOURNAL OF COAL GEOLOGY 卷: 196 页: 148-158 DOI: 10.1016/j.coal.2018.07.008 出版年: AUG 1 2018

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摘要: Nuclear magnetic resonance (NMR) has been widely used to evaluate the pore size distribution (PSD) properties of coals. However, the NMR signal itself only provides a relative distribution of pore size. To calculate an absolute pore size distribution from the NMR data, the T-2 cutoff value needs to be known. Meanwhile, the T-2 cutoff value is an indicator to divide the irreducible fluid and movable fluid in porous rock and a key factor for permeability prediction. Conventionally, the T-2 cutoff value is obtained by centrifugal experiments, the process of which is complicated and time consuming, and some T-2 cutoff value prediction models are not suitable for coals with complex pore structures. Hence, a new method is needed for T-2 cutoff value prediction. In this study, we performed scanning electron microscopy (SEM), low-temperature nitrogen adsorption/desorption (LTNA) and NMR experiments on 12 coal samples. The results of SEM and LTNA reveal the complex pore structures of the coals. According to the results from centrifugal experiments, the T-2 cutoff value is in the range from 0.5-2.8 ms for subbituminous coals, whereas it is 15-32 ms for anthracite coals. We present a fractal theory based method for T-2 cutoff value prediction. Using the estimated T-2 cutoff values, we calculated the movable porosities, PSD and permeability for the selected coals. The results show that the proposed permeability model provides significantly better permeability estimation than classic (Coates and SDR) models. These methods are applicable not only for coals, but also for other unconventional gas reservoir rocks such as gas shales.

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会议名称: Meeting of The Society-for-Organic-Petrology (TSOP)

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第 144 条，共 321 条

标题: Emerging Pt-based electrocatalysts with highly open nanoarchitectures for boosting oxygen reduction reaction

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摘要: Developing highly efficient and stable platinum (Pt)-based electrocatalysts for oxygen reduction reaction (ORR) is the most essential step toward the commercialization of fuel cells. Highly accessible reactive surfaces play a key role in boosting ORR for superior fuel cell performance due to the adequate exposure of the active surfaces and the feasible mass transport. Herein, we begin with a brief introduction to the design principles for an effective ORR electrocatalyst, which could plausibly possess high activity and durability at the same time. Corresponding with the requirements, the recent progress of rational design based on nanoarchitecture, synthesis, and electrochemical performances of Pt -based electrocatalysts with open construction is reviewed and explained accordingly. (C) 2018 Elsevier Ltd. All rights reserved.

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第 145 条，共 321 条

标题: SuperPCA: A Superpixelwise PCA Approach for Unsupervised Feature Extraction of Hyperspectral Imagery

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来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 56 期: 8 页: 4581-4593 DOI: 10.1109/TGRS.2018.2828029 出版年: AUG 2018

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摘要: As an unsupervised dimensionality reduction method, the principal component analysis (PCA) has been widely considered as an efficient and effective preprocessing step for hyperspectral image (HSI) processing and analysis tasks. It takes each band as a whole and globally extracts the most representative hands. However, different homogeneous regions correspond to different objects, whose spectral features are diverse. Therefore, it is inappropriate to carry out dimensionality reduction through a unified projection for an entire HSI. In this paper, a simple but very effective superpixelwise PCA (SuperPCA) approach is proposed to learn the intrinsic low-dimensional features of HSIs. In contrast to classical PCA models, the SuperPCA has four main properties: 1) unlike the traditional PCA method based on a whole image, the SuperPCA takes into account the diversity in different homogeneous regions, that is, different regions should have different projections; 2) most of the conventional feature extraction models cannot directly use the spatial information of HSIs, while the SuperPCA is able to incorporate the spatial context information into the unsupervised dimensionality reduction by superpixel segmentation; 3) since the regions obtained by superpixel segmentation have homogeneity, the SuperPCA can extract potential low-dimensional features even under noise; and 4) although the SuperPCA is an unsupervised method, it can achieve a competitive performance when compared with supervised approaches. The resulting features are discriminative, compact, and noise-resistant, leading to an improved HSI classification performance. Experiments on three public data sets demonstrate that the SuperPCA model significantly outperforms the conventional PCA-based dimensionality reduction baselines for HSI classification, and some state-of-the-art feature extraction approaches. The MATLAB source code is available at https://github.com/junjun-jiang/SuperPCA.

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标题: The impacts of renewable energy and technological innovation on environment-energy-growth nexus: New evidence from a panel quantile regression

作者: Chen, WH (Chen, Wenhui); Lei, YL (Lei, Yalin)

来源出版物: RENEWABLE ENERGY 卷: 123 页: 1-14 DOI: 10.1016/j.renene2018.02.026 出版年: AUG 2018

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摘要: To mitigate climate change, many studies have been conducted to identify the determinants of CO2 emissions. However, a consensus has not been reached yet on the issue because past work has often not considered the unobserved individual heterogeneity across countries. Therefore, this study revisits the environment-energy-growth nexus by employing a panel quantile regression to incorporate the effects of renewable energy consumption and technological innovation within the research background of global 30 countries over the period 1980-2014. The advantage of this method is considering the distributional heterogeneity to provide a detailed description of linkage between the CO2 emissions and driving factors at different emissions levels. The results show that the effects of determinants on CO2 emissions are heterogeneous. For high-emissions countries, the function of renewable energy consumption is limited in reducing CO2 emissions due to the smaller proportion of renewable energy use. Moreover, technological innovation greatly affects countries with relatively higher CO2 emissions. Therefore, one option is to financially support and apply technological innovations to generate renewable energy at lower costs as well as increase energy efficiency. Moreover, transforming the economic growth mode is helpful to transfer from non-renewable to renewable sources of energy to meet energy demand. (C) 2018 Elsevier Ltd. All rights reserved.

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第 147 条，共 321 条

标题: Late inception of a resiliently oxygenated upper ocean

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摘要: Rising oceanic and atmospheric oxygen levels through time have been crucial to enhanced habitability of surface Earth environments. Few redox proxies can track secular variations in dissolved oxygen concentrations around threshold levels for metazoan survival in the upper ocean. We present an extensive compilation of iodine-to-calcium ratios (I/Ca) in marine carbonates. Our record supports a major rise in the partial pressure of oxygen in the atmosphere at similar to 400 million years (Ma) ago and reveals a step change in the oxygenation of the upper ocean to relatively sustainable near-modern conditions at similar to 200 Ma ago. An Earth system model demonstrates that a shift in organic matter remineralization to greater depths, which may have been due to increasing size and biomineralization of eukaryotic plankton, likely drove the I/Ca signals at similar to 200 Ma ago.

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标题: Experimental study on spontaneous imbibition of recycled fracturing flow-back fluid to enhance oil recovery in low permeability sandstone reservoirs

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摘要: In light of the high treatment costs for massive amounts of fracturing flow-back fluid and its harmfulness to the environment, a novel method of recycled fracturing flow-back fluid (RFFF) to enhance oil recovery by spontaneous imbibition is proposed in this study; this method does not allow the flow-back fluid back to the ground, thereby preventing negative impacts. The wettability alteration and interfacial tension (IFT) can effectively strengthen the spontaneous imbibition to enhance oil recovery in low-permeability sandstone reservoirs. This study combines the effects of wettability alteration and IFT with the use of the RFFF, which is composed of viscoelastic surfactants, on the spontaneous imbibition in low-permeability outcrop cores. Contact angle (CA) experiments, IFT experiments, and spontaneous imbibition experiments are conducted. The CA and IFT experimental results showed that the RFFF solutions changed the wettability of the core surface from oil-wet to waterwet and easily reduced the IFT between the crude oil and the RFFF solution to 10(-3)-10(-2) mN/m, which improved the oil recovery by changing the capillary forces. The spontaneous imbibition results showed that the RFFF solutions at concentrations of 0.03 - 0.10 wt% resulted in a higher imbibition recovery due to the synergistic effect of the wettability alteration and the IFT, which was attributed to the wedge film structure and the spreading force. It can be concluded that the use of the RFFF has the potential to further enhance oil recovery after fracturing the formation in low-permeability reservoirs without letting the fluid flow back to the ground. The proposed method is multi-functional and does not only improve the oil recovery by integrating fracturing and displacement methods but also reduces the costs of reservoir development and protects the environment.

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标题: Structural geometry of orogenic gold deposits: Implications for exploration of world-class and giant deposits

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摘要: With very few exceptions, orogenic gold deposits formed in subduction-related tectonic settings in accretionary to collisional orogenic belts from Archean to Tertiary times. Their genesis, including metal and fluid source, fluid pathways, depositional mechanisms, and timing relative to regional structural and metamorphic events, continues to be controversial. However, there is now general agreement that these deposits formed from metamorphic fluids, either from metamorphism of intra-basinal rock sequences or de-volatilization of a subducted sediment wedge, during a change from a compressional to transpressional, less commonly transtensional, stress regime, prior to orogenic collapse. In the case of Archean and Paleoproterozoic deposits, the formation of orogenic gold deposits was one of the last events prior to cratonization. The late timing of orogenic gold deposits within the structural evolution of the host orogen implies that any earlier structures may be mineralized and that the current structural geometry of the gold deposits is equivalent to that at the time of their formation provided that there has been no significant post-gold orogenic overprint. Within the host volcano-sedimentary sequences at the province scale, world-class orogenic gold deposits are most commonly located in second-order structures adjacent to crustal scale faults and shear zones, representing the first-order ore-forming fluid pathways, and whose deep lithospheric connection is marked by lamprophyre intrusions which, however, have no direct genetic association with gold deposition. More specifically, the gold deposits are located adjacent to similar to 10 degrees-25 degrees district-scale jogs in these crustal-scale faults. These jogs are commonly the site of arrays of similar to 70 degrees cross faults that accommodate the bending of the more rigid components, for example volcanic rocks and intrusive sills, of the host belts. Rotation of blocks between these accommodation faults causes failure of more competent units and/or reactivation and dilation of pre-existing structures, leading to deposit-scale focussing of ore-fluid and gold deposition. Anticlinal or antiformal fold hinges, particularly those of 'locked-up' folds with similar to 30 degrees apical angles and overturned back limbs, represent sites of brittle-ductile rock failure and provide one of the more robust parameters for location of orogenic gold deposits.

In orogenic belts with abundant pre-gold granitic intrusions, particularly Precambrian granitegreenstone terranes, the boundaries between the rigid granitic bodies and more ductile greenstone sequences are commonly sites of heterogeneous stress and inhomogeneous strain. Thus, contacts between granitic intrusions and volcano-sedimentary sequences are common sites of ore-fluid infiltration and gold deposition. For orogenic gold deposits at deeper crustal levels, ore-forming fluids are commonly focused along strain gradients between more compressional zones where volcano-sedimentary sequences are thinned and relatively more extensional zones where they are thickened. World-class orogenic gold deposits are commonly located in the deformed volcano-sedimentary sequences in such strain gradients adjacent to triple-point junctions defined by the granitic intrusions, or along the zones of assembly of micro-blocks on a regional scale. These repetitive province to district-scale geometrical patterns of structures within the orogenic belts are clearly critical parameters in geology-based exploration targeting for orogenic gold deposits. (C) 2018, China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V.

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标题: Neoarchean-Paleoproterozoic terrane assembly and Wilson cycle in the North China Craton: an overview from the central segment of the Trans North China Orogen

作者: Tang, L (Tang, Li); Santosh, M (Santosh, M.)

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摘要: The North China Craton (NCC) is one of the important Precambrian nuclei of the globe as well as an integral component of the Paleoproterozoic supercontinent Columba. The NCC is considered in popular models as an assembly of two major crustal blocks, the Eastern and Western Blocks, which were sutured along the Trans-North China Orogen (TNCO), which represents a major Paleoproterozoic collisional orogen. The central segment of the TNCO preserves important keys to unravel the tectonic history of amalgamation and cratonization of the NCC. Here we present an overview on the lithology, geochemistry, geochronology, Lu-Hf isotopes and metamorphic history of the Neoarchean to Paleoproterozoic rocks in the major basement terranes from the central segment of the TNCO. The available data allow us to re-construct the major Precambrian events from the heart of the NCC as follows. (1) 2.58-2.48 Ga: amalgamation of three microblocks (Ordos, Qianhuai and Xuchang) along the Wutai granite-greenstone belt and its branch at the Zanhuang area, together with the convergence of major micro blocks along other -2.5 Ga granite-greenstone belts leading to the initial cratonization of the NCC. (2) 2.50-2.45 Ga: post-collisional extension as represented by undeformed mafic dykes and granitoid dykes or plutons, resulting in the opening of an oceanic basin along the Hengshan and Huai'an-Xuanhua Complexes. (3) 2.45-2.12 Ga: subduction in the Hengshan, Hual'an-Xuanhua and Luliang Complexes, and simultaneous rifting in the Fuping, Wutai and Zanhuang Complexes. (4) 2.12-1.98 Ga: opening of oceanic basins in the Wutai and Fuping areas followed by double subduction of the oceanic lithosphere and arc magmatism in the Fuping, Wutai and Ltiliang Complexes, with coeval rifting in the northern part as represented by the Hengshan and Huai'anXuanhua Complexes and the southern side as represented by the Zanhuang Complex. (5) 1.96-1.80 Ga: the assembly of the separated terranes (or complexes) driven by the amalgamation of the Western and Eastern Blocks. The collisional event may have occurred at 1.96-1.90 Ga, and the 1.88-1.80 Ga metamorphic ages might represent the retrograde cooling during exhumation. (6) Termination of the collisional event represented by post-collisional intrusions of granitoids, charnockites and pegmatites until ca. 1.74 Ga. Thus the central segment of the TNCO records a prolonged Wilson cycle following the initial cratonization of the NCC during Neoarchean, and involved multiple rift-subduction and collisional processes in the Paleoproterozoic resulting in the unified NCC and its incorporation into the supercontinent Columbia.

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第 151 条，共 321 条

标题: Crustal architecture and metallogenesis in the south-eastern North China Craton

作者: Deng, J (Deng, Jun); Wang, CM (Wang, Changming); Bagas, L (Bagas, Leon); Santosh, M (Santosh, M.); Yao, EY (Yao, Enya)

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摘要: The south-eastern part of the North China Craton (NCC), the major historical source of gold supply to the former Emperors of China, continues to be a potential target for gold exploration. With a view to gain insights on the crustal architecture and gold metallogeny of this region, this contribution combines geological and Nd-Hf-isotopic data from magmatic rocks associated with the ore mineralisation. We integrate Nd-Hf isotopic data from published works as a tool to present isotopic maps. These maps highlight the location of major tectonic structures, and their relationship with the distribution of mineral deposits in the south-eastern NCC. The porphyry and porphyry-skam Cu(-Au-Mo) deposits in the Luxi area in eastern NCC are associated with magmatic rocks and are located in zones with variable epsilon Nd-epsilon Hf values and T-DM(c)-T-DM(2) ages representing dominant Paleoproterozoic to Mesoproterozoic and reworked crustal components with minor mantle material. In contrast, the Jiaodong type Au and porphyry-skam Mo(-W-Cu) deposits are associated with magmatic rocks emplaced in domains with low-epsilon Nd-epsilon Hf values and older T-DM(c)-T-DM(2) ages characterised by dominantly Archean-Paleoproterozoic reworked crustal components in the Jiaobei Terrane and the Sulu Orogen. Our study thus demarcates distinct crustal provinces and source components in generating some of the world-class gold deposits.

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第 152 条，共 321 条

标题: A Modified Multistable Chaotic Oscillator

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来源出版物: INTERNATIONAL JOURNAL OF BIFURCATION AND CHAOS 卷: 28 期: 7 文献号: 1850085 DOI: 10.1142/S0218127418500852 出版年: JUN 30 2018

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摘要: In this paper, by modifying a known two-dimensional oscillator, we obtain an interesting new oscillator with coexisting limit cycles and point attractors. Then by changing this new system to its forced version and choosing a proper set of parameters, we introduce a chaotic system with some very interesting features. In this system, not only can we see the coexistence of different types of attractors, but also a fascinating phenomenon: some initial conditions can escape from the gravity of nearby attractors and travel far away before being trapped in an attractor beyond the usual access.

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标题: Health information privacy concerns, antecedents, and information disclosure intention in online health communities

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摘要: This study explores the antecedents and consequences of health information privacy concerns in online health communities by integrating the dual calculus and protection motivation theories. On the basis of survey data from 337 users, health information privacy concerns, together with informational and emotional support, significantly influence personal health information (PHI) disclosure intention. Privacy concerns are negatively influenced by two coping appraisals (i.e., response efficacy and self-efficacy) and positively affected by two threat appraisals (i.e., perceived vulnerability and perceived severity). The perceived health status differentially moderates the effects of privacy concerns and informational support on the PHI disclosure intention.

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标题: Formation of Archean (3600-2500 Ma) continental crust in the Dharwar Craton, southern India

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摘要: The generation, preservation and destruction of continental crust on Earth is of wide interest in understanding the formation of continents, cratons and supercontinents as well as related mineral deposits. In this contribution, we integrate the available field, petrographic, geochronologic, elemental Nd-Hf-Pb isotope data for greenstones, TTG gneisses, sanukitoids and anatectic granites from the Dharwar Craton (southern India). This review allows us to evaluate the accretionary processes of juvenile crust, mechanisms of continental growth, and secular evolution of geodyrtamic processes through the 3600-2500 Ma window, hence providing important insights into building of continents in the Early Earth. The Dharwar Craton formed by assembly of micro-blocks with independent thermal records and accretionary histories. The craton can be divided into three crustal blocks (western, central and eastern) separated by major shear zones. The western block contains some of the oldest basement rocks with two generations of volcano-sedimentary greenstone sequences and discrete potassic plutons whereas the central block consist of older migmatitic TTGs, abundant younger transitional TTGs, remnants of ancient high grade supracrustal rocks, linear volcanic-dominated greenstone belts, voluminous calc-alkaline granitoids of sanukitoid affinity and anatectic granites. In contrast, the eastern block comprises younger transitional TTGs, abundant diatexites, thin volcanic-sedimentary greenstone belts and calc-alkaline plutons. Published geochronologic data show five major periods of felsic crust formation at ca. 3450-3300 Ma, 3230-3150 Ma, 3000-2960 Ma, 2700-2600 Ma, and 2560-2520 Ma which are sub-contemporaneous with the episodes of greenstone volcanism. U-Pb ages of inherited zircons in TTGs, as well as detrital zircons together with Nd-Pb-Hf isotope data, reveal continental records of 3800-3600 Ma. The U-Pb zircon data suggest at least four major reworking events during ca. 3200 Ma, 3000 Ma, 2620-2600 Ma, and 2530-2500 Ma corresponding to lower crustal melting and spatially linked high grade metamorphic events. The TTGs are sub-divided into the older (3450-3000 Ma) TTGs and the younger (2700-2600 Ma) transitional TTGs. The older TTGs can be further sub-divided into low-Al and high-Al groups. Elemental and isotopic data suggest that the low-Al type formed by melting of oceanic island arc crust within plagioclase stability field. In contrast, the elemental and isotopic features for the high-Al group suggest derivation of their magmatic precursor by melting of oceanic arc crust at deeper levels (55-65 km)with variable garnet and ilmenite in residue. The transitional TTGs likely formed by melting of composite sources involving both enriched oceanic arc crust and sub-arc mantle with minor contamination of ancient crustal components. The geochemical and isotopic compositions of granitoids with sanukitoid affinity suggest derivation from enriched mantle reservoirs. Finally, anatectic granites were produced by reworking of crustal sources with different histories. In the light of the data reviewed in this contribution, we propose the following scenario for the tectonic evolution of the Dharwar Craton. During 3450-3000 Ma, TTGs sources (oceanic arc crust) formed by melting of down going slabs and subsequent melting of such newly formed crust at different depths resulted in TTG magmas. On the contrary, by 2700 Ma the depth of slab melting increased.

Melting of slab at greater depth alongside the detritus results in enriched melts partly modified the overlying mantle wedge. Subsequent melting of such newly formed enriched oceanic arc crust and surrounding arc-mantle generated the magmatic precursor to transitional TTGs. Finally at ca. 2600-2560 Ma, eventual breakoff of down going slab caused mantle upwelling which induced low degree (10-15%) melting of overlying enriched mantle at different depths, thereby, generating the sanukitoid magmas which upon emplacement into the crust caused high temperature metamorphism, reworking and final cratonization.

The crustal accretion patterns in the Dharwar Craton share similarities with those in other Archean cratons such as the Bundelkhand Craton in Central India, Pilbara-Yilgarn Craton in Western Australia, Southern Africa (Swaziland and Limpopo belt), North China Craton, Tanzania Craton, Antongil Craton, NE Madagascar.

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第 155 条，共 321 条

标题: Carbon Quantum Dot Implanted Graphite Carbon Nitride Nanotubes: Excellent Charge Separation and Enhanced Photocatalytic Hydrogen Evolution

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摘要: Graphite carbon nitride (g-C3N4) is a promising candidate for photocatalytic hydrogen production, but only shows moderate activity owing to sluggish photocarrier transfer and insufficient light absorption. Herein, carbon quantum dots (CQDs) implanted in the surface plane of g-C3N4 nanotubes were synthesized by thermal polymerization of freeze-dried urea and CQDs precursor. The CQD-implanted g-C3N4 nanotubes (CCTs) could simultaneously facilitate photoelectron transport and suppress charge recombination through their specially coupled heterogeneous interface. The electronic structure and morphology were optimized in the CCTs, contributing to greater visible light absorption and a weakened barrier of the photocarrier transfer. As a result, the CCTs exhibited efficient photocatalytic performance under light irradiation with a high H-2 production rate of 3538.3 mu mol g(-1) h(-1) and a notable quantum yield of 10.94% at 420 nm.

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标题: The functionality of prebiotics as immunostimulant: Evidences from trials on terrestrial and aquatic animals

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摘要: The gut immune system is, the main option for maintaining host's health, affected by numerous factors comprising dietary constituents and commensal bacteria. These dietary components that affect the intestinal immunity and considered as an alternative of antibiotics are called immunosaccharides. Fructooligosaccharide (FOS), Galactooligosaccharide (GOS), inulin, dietary carbohydrates, and xylooligosaccharide (XOS) are among the most studied prebiotics in human as well as in aquaculture. Although prebiotics and probiotics have revealed potential as treatment for numerous illnesses in both human and fish, a comprehensive understanding of the molecular mechanism behind direct and indirect effect on the intestinal immune response will help more and perhaps extra effective therapy intended for ailments. This review covers the most newly deep-rooted scientific outcomes about the direct and indirect mechanism through which these dietetic strategies can affect intestinal immunity of terrestrial and aquatic animals. Prebiotics exert an influence on gut immune system via the increase in lysozyme and phagocytic activity, macrophage activation and stimulation of monocyte-derived dendritic cells. Furthermore, these functional molecules also enhance epithelial barrier function, beneficial gut microbial population, and production of intermediate metabolites for example short chain fatty acids (SCFAs) that assist in balancing the immune system. Moreover, emphasis will be sited on the relationship among food/feed, the microbiota, and the gut immune system. In conclusion, further studies are nonetheless essential to confirm the direct effect of prebiotics on immune response.

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标题: Tectonic evolution of the Qilian Shan: An early Paleozoic orogen reactivated in the Cenozoic

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摘要: The Qilian Shan, located along the northeastern margin of the Tibetan Plateau, has experienced multiple episodes of tectonic deformation, including Neoproterozoic continental breakup, early Paleozoic subduction and continental collision, Mesozoic extension, and Cenozoic intracontinental orogenesis resulting from the India-Asia collision. In the central Qilian Shan, pre-Mesozoic ophiolite complexes, passive-continental margin sequences, and strongly deformed forearc strata were juxtaposed against arc plutonic/ volcanic rocks and ductilely deformed crystalline rocks during the early Paleozoic Qilian orogen. To better constrain this orogen and the resulting closure of the Neoproterozoic-Ordovician Qilian Ocean, we conducted an integrated investigation involving geologic mapping, U-Th-Pb zircon and monazite geochronology, whole-rock geochemistry, thermobarometry, and synthesis of existing data sets across northern Tibet. The central Qilian Shan experienced two phases of arc magmatism at 960-870 Ma and 475-445 Ma that were each followed by periods of protracted continental collision. Integrating our new data with previously published results, we propose the following tectonic model for the Proterozoic-Paleozoic history of northern Tibet. (1) Early Neoproterozoic subduction accommodated the convergence and collision between the South Tarim-Qaidam and North Tarim-North China continents. (2) Late Neoproterozoic rifting partially separated a peninsular Kunlun-Qaidam continent from the southern margin of the linked Tarim-North China craton and opened the Qilian Ocean as an embayed marginal sea; this separation broadly followed the trace of the earlier Neoproterozoic suture zone. (3) South-dipping subduction along the northern margin of the Kunlun-Qaidam continent initiated in the Cambrian, first developing as the Yushigou supra-subduction zone ophiolite and then transitioning into the continental Qilian arc. (4) South-dipping subduction, arc magmatism, and the convergence between Kunlun-Qaidam and North China continued throughout the Ordovician, with a trench-parallel intra-arc strike-slip fault system that is presently represented by high-grade metamorphic rocks that display a pervasive right-lateral shear sense. (5) Counterclockwise rotation of the peninsular Kunlun-Qaidam continent toward North China led to the closure of the Qilian Ocean, which is consistent with the right-lateral kinematics of intra-arc strike-slip faulting observed in the Qilian Shan and the westward tapering map-view geometry of Silurian fiysch-basin strata. Continental collision at ca. 445-440 Ma led to widespread plutonism across the Qilian Shan and is recorded by recrystallized monazite (ca. 450-420 Ma) observed in this study. Our tectonic model implies the parallel closure of two oceans of different ages along the trace of the Qilian suture zone since ca. 1.0 Ga.

In addition, the Qilian Ocean was neither the Proto- nor Paleo-Tethys (i.e., the earliest ocean separating Gondwana from Laurasia), as previously suggested, but was rather a relatively small embayed sea along the southern margin of the Laurasian continent. We also document >200 km of Cenozoic north-south shortening across the study area. The observed shortening distribution supports supports models of Tibetan Plateau development that involve distributed crustal shortening and southward underthrusting of Eurasia beneath the plateau. This India-Asia convergence-related deformation is focused along the sites of repeated ocean closure. Major Cenozoic left-slip faults parallel these sutures, and preexisting subduction-melange channels may have facilitated Cenozoic shortening and continental underthrusting

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标题: Progress and performance evaluation of BeiDou global navigation satellite system: Data analysis based on BDS-3 demonstration system

作者: Yang, YX (Yang, Yuanxi); Xu, YY (Xu, Yangyin); Li, JL (Li, Jinlong); Yang, C (Yang, Cheng)

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摘要: The first two Medium Earth Orbit (MEO) satellites of the third generation of BeiDou satellite navigation System (BDS-3) were successfully launched on November 5, 2017. This historical launch starts the new era of the global navigation satellite system of BeiDou. Before the first two satellites of BDS-3, a demonstration system for BDS-3 with five satellites, including two Inclined Geosynchronous Orbit satellites (IGSO) and three MEO satellites, was established between 2015 and 2016 for testing the new payloads, new designed signals and new techniques. In the demonstration system, the new S frequency signal and satellite hydrogen clock as well as inter-satellite link (ISL) based on Ka-band signals with time-division multiple addresses (TDMA) were tested. This paper mainly analyzes the performances of the demonstration system, including the signalto- noise ratios, pseudorange errors and the multipath errors of the civilian signals of BDS-3. The qualities of signals in space, time synchronization and timing precision were tested as well. Most of the performances were compared with those of the regional BeiDou satellite navigation system (BDS-2). At last, the performances of positioning, navigation and timing (PNT) of the future BeiDou global system (BDS-3) were evaluated based on the signal quality of the present demonstration satellite system.

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第 159 条，共 321 条

标题: Recent Advances in Layered Ti3C2Tx MXene for Electrochemical Energy Storage

作者: Xiong, DB (Xiong, Dongbin); Li, XF (Li, Xifei); Bai, ZM (Bai, Zhimin); Lu, SG (Lu, Shigang)

来源出版物: SMALL 卷: 14 期: 17 文献号: 1703419 DOI: 10.1002/smll.201703419 出版年: APR 26 2018

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摘要: Ti3C2Tx, a typical representative among the emerging family of 2D layered transition metal carbides and/or nitrides referred to as MXenes, has exhibited multiple advantages including metallic conductivity, a plastic layer structure, small band gaps, and the hydrophilic nature of its functionalized surface. As a result, this 2D material is intensively investigated for application in the energy storage field. The composition, morphology and texture, surface chemistry, and structural configuration of Ti3C2Tx directly influence its electrochemical performance, e.g., the use of a well-designed 2D Ti3C2Tx as a rechargeable battery anode has significantly enhanced battery performance by providing more chemically active interfaces, shortened ion-diffusion lengths, and improved in-plane carrier/charge-transport kinetics. Some recent progresses of Ti3C2Tx MXene are achieved in energy storage. This Review summarizes recent advances in the synthesis and electrochemical energy storage applications of Ti3C2Tx MXene including supercapacitors, lithium-ion batteries, sodium-ion batteries, and lithium-sulfur batteries. The current opportunities and future challenges of Ti3C2Tx MXene are addressed for energy-storage devices. This Review seeks to provide a rational and in-depth understanding of the relation between the electrochemical performance and the nanostructural/chemical composition of Ti3C2Tx, which will promote the further development of 2D MXenes in energy-storage applications.

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第 160 条，共 321 条

标题: Highly Efficient Blue Emission and Superior Thermal Stability of BaAI(12)O(19):Eu2+ Phosphors Based on Highly Symmetric Crystal Structure

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来源出版物: CHEMISTRY OF MATERIALS 卷: 30 期: 7 页: 2389-2399 DOI: 10.1021/acs.chemmater.8b00464 出版年: APR 10 2018

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摘要: Highly efficient phosphor materials with superior thermal stability are indispensable for phosphor-converted white light-emitting diodes (pc-WLEDs) solid state lighting. In order to obtain a high quality warm white light, near-ultraviolet (n-UV) chips combined with trichromatic phosphors have be extensively studied. Among them, the development of efficient blue phosphor remains a challenging task. In view of the close correlation between 5d-4f transitions of rare earth ions and the coordination environment of host lattice, many studies have been dedicated to improving the photoluminescence performances by modifying the lattice coordination environment including the lattice rigidity and symmetry. In this work, we reported highly efficient blue-emitting Eu2+-doped BaAI(12)O(19) (BAO) phosphors with excellent thermal stability, which were prepared via the traditional high-temperature solid state reaction routes. According to the X-ray powder diffraction (XRD) Rietveld refinement analysis, BAO owned a highly symmetric layer structure with two Ba polyhedrons, marked as Ba(1)O(9 )and Ba(2)O-10 , respectively. The diffuse reflectance spectra revealed the optical band gap to be 4.07 eV. Due to the suitable optical bandgap, the Eu2+ ions could realize a highly efficient doping in the BAO matrix. The photoluminescence excitation (PLE) spectra for asprepared BAO:Eu2+ phosphors exhibited a broad absorption band in the region from 250 to 430 nm, matching well with the n-UV LED chip. Under the UV radiation, it is highly luminous (internal quantum yields (IQYs) = 90%) with the peak around 443 nm. Furthermore, the color purity of BAO:Eu2+ phosphors could achieve 92%, ascribing to the narrow full width at halfmaximum (fwhm = 52 nm), which was even much better than that of commercially available BAM:Eu 2+ phosphor (color purity = 91.34%, fwhm = 51.7 nm). More importantly, the as-prepared BAO:Eu2+ phosphor showed extra high thermal stability when working in the region of 298-550 K, which was a bit better than that of commercial BAM:Eu2+ phosphors. According to the distortion calculation of Ba crystallographic occupation, the superior thermal stability could be attributed to the highly symmetric crystal structure of BAO host. In view of the excellent luminescence performances of BAO:Eu2+, it is a promising blue-emitting phosphor for n-UV WLED.

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第 161 条，共 321 条

标题: Progress in enhancement of CO2 absorption by nanofluids: A mini review of mechanisms and current status

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来源出版物: RENEWABLE ENERGY 卷: 118 页: 527-535 DOI: 10.1016/j.renene.2017.11.031 出版年: APR 2018

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摘要: Nanotechnology is a new technique which is widely applied in several energy systems. The novel process of CO2 absorption or conversion enhancement using nanofluids receives significant attention in recent decades. A comprehensive literature review on CO2 absorption enhancement by nanofluids is here compiled. This present review covers the nanofluids preparation methods, enhancement mechanisms, and the enhancement factors of the gas-liquid system. The nanofluids parameters and fluid flow rates effects on the enhancement of CO2 absorption are discussed and highlighted. Moreover, this review indicates that the CO2-nanofluids system is a promising technique for gas pollution control. However, a lot of future works are needed to increase the absorption behavior and performance of the nanofluids as well as reduce the energy consumption during the capture process. (C) 2017 Elsevier Ltd. All rights reserved.

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第 162 条，共 321 条

标题: Life cycle assessment and environmental cost accounting of coal-fired power generation in China

作者: Wang, JM (Wang, Jinman); Wang, RG (Wang, Ruogu); Zhu, YC (Zhu, Yucheng); Li, JY (Li, Jiayan)

来源出版物: ENERGY POLICY 卷: 115 页: 374-384 DOI: 10.1016/j.enpol.2018.01.040 出版年: APR 2018

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摘要: It is necessary to analyze the environmental impact of the entire process of coal-fired power generation to take effective measures for controlling energy consumption and reducing pollutant emission. However, very few studies have examined the coal mining, washing and transportation stages in the life cycle of coal-fired power generation and it's environmental cost. In this study, the life cycle assessment (LCA) method was adopted to analyze the environmental impact of coal-fired power generation in China. Further, the relevant cost theory was used to calculate the resource consumption cost and external environmental cost of coal-fired power generation. The key environmental impact category was smoke and dust, and the main emissions were CO2, CO, SO2, TSP, COD, and boiler ash. The emissions with high environmental cost were coal, SO2, COD, and boiler ash. The environmental cost at the power generation stage was the highest, with a value of $50.24. The resource consumption cost and external environmental cost per unit of MWh power in the life cycle was $46.01 and $22.90, respectively. Upgrading the facilities for emission reduction, improving emission standards of pollutants, and strengthening process management of coal-fired power generation are effective ways to reduce the burden on the environment.

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第 163 条，共 321 条

标题: Microporous Framework Induced Synthesis of Single-Atom Dispersed Fe-N-C Acidic ORR Catalyst and Its in Situ Reduced Fe-N-4 Active Site Identification Revealed by X-ray Absorption Spectroscopy

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来源出版物: ACS CATALYSIS 卷: 8 期: 4 页: 2824-2832 DOI: 10.1021/acscatal.8b00138 出版年: APR 2018

Web of Science 核心合集中的 "被引频次": 374

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摘要: Developing highly efficient, low-cost oxygen reduction catalysts, especially in acidic medium, is of significance toward fuel cell commercialization. Although pyrolyzed Fe-N-C catalysts have been regarded as alternatives to platinum based catalytic materials, further improvement requires precise control of the Fe-N-x structure at the molecular level and a comprehensive understanding of catalytic site structure and the ORR mechanism on these materials. In this report, we present a microporous metal-organic-framework-confined strategy toward the preferable formation of single-atom dispersed catalysts. The onset potential for Fe-N-C is 0.92 V, comparable to that of Pt/C and outperforming most noble-metal-free catalysts ever reported. A high-spin Fe3+-N-4 configuration is revealed by the Fe-57 Mossbauer spectrum and X-ray absorption spectroscopy for Fe L-edge, which will convert to Fe2+-N-4 at low potential. The in situ reduced Fe2+-N-4 moiety from high-spin O-x-Fe3+-N-4 contributes to most of the ORR activity due to its high turnover frequency (TOF) of ca. 1.71 e s(-1) sites(-1).

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第 164 条，共 321 条

标题: An Intracellular H2O2-Responsive AIEgen for the Peroxidase-Mediated Selective Imaging and Inhibition of Inflammatory Cells

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摘要: Inflammatory cells have gained widespread attention because inflammatory diseases increase the risk for many types of cancer. Therefore, it is urgent and important to implement detection and treatment methods for inflammatory cells. Herein, we constructed a theranostic probe with aggregation-induced emission (AIE) characteristics, in which tetraphenylethene (TPE) was modified with two tyrosine (Tyr) moieties. Owing to the H2O2-dependent, enzyme-catalyzed dityrosine formation, Tyr-containing TPE (TT) molecules crosslink through dityrosine linkages to induce the formation of hydrophobic aggregates, activating the AIE process in inflammatory cells that contain H2O2 and overexpress myeloperoxidase. The emission turn-on resulting from the crosslinking of TT molecules could be used to distinguish between inflammatory and normal cells. Moreover, the massive TT aggregates induced mitochondria damage and cell apoptosis. This study demonstrates that the H2O2-responsive peroxidase-activated AIEgen holds great promise for inflammatory-cell selective imaging and inhibition.

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第 165 条，共 321 条

标题: Ice-VII inclusions in diamonds: Evidence for aqueous fluid in Earth's deep mantle

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摘要: Water-rich regions in Earth's deeper mantle are suspected to play a key role in the global water budget and the mobility of heat-generating elements. We show that ice-VII occurs as inclusions in natural diamond and serves as an indicator for such water-rich regions. Ice-VII, the residue of aqueous fluid present during growth of diamond, crystallizes upon ascent of the host diamonds but remains at pressures as high as 24 gigapascals; it is now recognized as a mineral by the International Mineralogical Association. In particular, ice-VII in diamonds points toward fluid-rich locations in the upper transition zone and around the 660-kilometer boundary.

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第 166 条，共 321 条

标题: Nanomaterials and technologies for low temperature solid oxide fuel cells: Recent advances, challenges and opportunities

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摘要: Solid oxide fuel cells (SOFCs) show considerable promise for meeting the current ever-increasing energy demand and environmental sustainability requirements because of their high efficiency, low environmental impact, and distinct fuel diversity. In the past few decades, extensive R&D efforts have been focused on lowering operational temperatures in order to decrease the system (stack and balance-of-plant) cost and improve the longevity of operationally useful devices of commercial relevance. Nanomaterials and related nanotechnologies have the potential to improve SOFC performance because of their advantageous functionalities, namely, their enlarged surface area and unique surface and interface properties compared to their microscale analogs. Recently, the use of nanomaterials has increased rapidly, as reflected by the exponential growth in the number of publications since 2002. In this work, we present a comprehensive summary of nanoparticles, nano-thin films and nanocomposites with different crystal phases, morphologies, microstructures, electronic properties, and electrochemical performances for low temperature SOFCs (LT-SOFCs), with focus on efforts to enhance electrical efficiency, to induce novel fundamental properties that are inaccessible in microcrystalline materials, and to promote the commercialization of LT-SOFCs. Recent progress in the applications of many classically or newly chemical and physical nanomaterials and nanofabrication techniques, such as thin film vacuum deposition, impregnation, electrospinning, spark plasma sintering, hard-and soft-template methods, and in-situ nanoparticle surface exsolution are also thoroughly described. The technological and scientific advantages and limitations related to the use of nanomaterials and nanotechnologies are highlighted, along with our expectations for future research within this emerging field.

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第 167 条，共 321 条

标题: Prediction of landslide displacement with step-like behavior based on multialgorithm optimization and a support vector regression model

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摘要: Landslide prediction is important for mitigating geohazards but is very challenging. In landslide evolution, displacement depends on the local geological conditions and variations in the controlling factors. Such factors have led to the "steplike" deformation of landslides in the Three Gorges Reservoir area of China. Based on displacement monitoring data and the deformation characteristics of the Baishuihe Landslide, an additive time series model was established for landslide displacement prediction. In the model, cumulative displacement was divided into three parts: trend, periodic, and random terms. These terms reflect internal factors (geological environmental, gravity, etc.), external factors (rainfall, reservoir water level, etc.), and random factors (uncertainties). After statistically analyzing the displacement data, a cubic polynomial model was proposed to predict the trend term of displacement. Then, multiple algorithms were used to determine the optimal support vector regression (SVR) model and train and predict the periodic term. The results showed that the landslide displacement values predicted based on data time series and the genetic algorithm (GA-SVR) model are better than those based on grid search (GS-SVR) and particle swarm optimization (PSOSVR) models. Finally, the random term was accurately predicted by GA-SVR. Therefore, the coupled model based on temporal data series and GA-SVR can be used to predict landslide displacement. Additionally, the GA-SVR model has broad application potential in the prediction of landslide displacement with "step-like" behavior.

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第 168 条，共 321 条

标题: Landslide susceptibility modeling applying machine learning methods: A case study from Longju in the Three Gorges Reservoir area, China

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摘要: Landslide is a common natural hazard and responsible for extensive damage and losses in mountainous areas. In this study, Longju in the Three Gorges Reservoir area in China was taken as a case study for landslide susceptibility assessment in order to develop effective risk prevention and mitigation strategies. To begin, 202 landslides were identified, including 95 colluvial landslides and 107 rockfalls. Twelve landslide causal factor maps were prepared initially, and the relationship between these factors and each landslide type was analyzed using the information value model. Later, the unimportant factors were selected and eliminated using the information gain ratio technique. The landslide locations were randomly divided into two groups: 70% for training and 30% for verifying. Two machine learning models: the support vector machine (SVM) and artificial neural network (ANN), and a multivariate statistical model: the logistic regression (LR), were applied for landslide susceptibility modeling (LSM) for each type. The LSM index maps, obtained from combining the assessment results of the two landslide types, were classified into five levels. The performance of the LSMs was evaluated using the receiver operating characteristics curve and Friedman test. Results show that the elimination of noise-generating factors and the separated modeling of each landslide type have significantly increased the prediction accuracy. The machine learning models outperformed the multivariate statistical model and SVM model was found ideal for the case study area.

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第 169 条，共 321 条

标题: A NEW METHOD FOR CALCULATING FRACTAL DIMENSIONS OF POROUS MEDIA BASED ON PORE SIZE DISTRIBUTION

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来源出版物: FRACTALS-COMPLEX GEOMETRY PATTERNS AND SCALING IN NATURE AND SOCIETY 卷: 26 期: 1 文献号: 1850006 DOI: 10.1142/S0218348X18500068 出版年: FEB 2018

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摘要: Fractal theory has been widely used in petrophysical properties of porous rocks over several decades and determination of fractal dimensions is always the focus of researches and applications by means of fractal-based methods. In this work, a new method for calculating pore space fractal dimension and tortuosity fractal dimension of porous media is derived based on fractal capillary model assumption. The presented work establishes relationship between fractal dimensions and pore size distribution, which can be directly used to calculate the fractal dimensions. The published pore size distribution data for eight sandstone samples are used to calculate the fractal dimensions and simultaneously compared with prediction results from analytical expression. In addition, the proposed fractal dimension method is also tested through Micro-CT images of three sandstone cores, and are compared with fractal dimensions by box-counting algorithm. The test results also prove a self-similar fractal range in sandstone when excluding smaller pores.

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第 170 条，共 321 条

标题: Global land-water nexus: Agricultural land and freshwater use embodied in worldwide supply chains

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摘要: As agricultural land and freshwater inextricably interrelate and interact with each other, the conventional water and land policy in "silos" should give way to nexus thinking when formulating the land and water management strategies. This study constructs a systems multi-regional input-output (MRIO) model to expound global land-water nexus by simultaneously tracking agricultural land and freshwater use flows along the global supply chains. Furthermore, land productivity and irrigationwater requirements of 160 crops in different regions are investigated to reflect the land-water linkage. Results show that developed economies (e.g., USA and Japan) and major large developing economies (e.g., mainland China and India) are the overriding drivers of agricultural land and freshwater use globally. In general, significant net transfers of these two resources are identified from resource-rich and less-developed economies to resource-poor and more-developed economies. For some crops, bluewater productivity is inversely related to land productivity, indicating that irrigationwater consumption is sometimes at odds with land use. The results could stimulus international cooperation for sustainable land and freshwater management targeting on original suppliers and final consumers along the global supply chains. Moreover, crop-specific land-water linkage could provide insights for trade-off decisions on minimizing the environmental impacts on local land and water resources. (C) 2017 Elsevier B.V. All rights reserved.

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标题: Hydrological Cycle in the Heihe River Basin and Its Implication for Water Resource Management in Endorheic Basins

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摘要: Endorheic basins around the world are suffering from water and ecosystem crisis. To pursue sustainable development, quantifying the hydrological cycle is fundamentally important. However, knowledge gaps exist in how climate change and human activities influence the hydrological cycle in endorheic basins. We used an integrated ecohydrological model, in combination with systematic observations, to analyze the hydrological cycle in the Heihe River Basin, a typical endorheic basin in arid region of China. The water budget was closed for different landscapes, river channel sections, and irrigation districts of the basin from 2001 to 2012. The results showed that climate warming, which has led to greater precipitation, snowmelt, glacier melt, and runoff, is a favorable factor in alleviating water scarcity. Human activities, including ecological water diversion, cropland expansion, and groundwater overexploitation, have both positive and negative effects. The natural oasis ecosystem has been restored considerably, but the overuse of water in midstream and the use of environmental flow for agriculture in downstream have exacerbated the water stress, resulting in unfavorable changes in surface-ground water interactions and raising concerns regarding how to fairly allocate water resources. Our results suggest that the water resource management in the region should be adjusted to adapt to a changing hydrological cycle, cropland area must be reduced, and the abstraction of groundwater must be controlled. To foster long-term benefits, water conflicts should be handled from a broad socioeconomic perspective. The findings can provide useful information on endorheic basins to policy makers and stakeholders around the world.

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标题: Honeycomb-like structured biological porous carbon encapsulating PEG: A shape-stable phase change material with enhanced thermal conductivity for thermal energy storage

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摘要: Shape-stable and high-thermal conductivity composite phase change materials (c-PCMs) composed of polyethylene glycol (PEG) and biological porous carbon (BPC) are investigated. BPC based on potatoes and white radishes are obtained by the carbonization method. The thermal conductivity of the BPC increases with the rising of the carbonization temperature due to the higher graphitization degree. Especially, BPC calcined at 1300 degrees C for 2 h resulted in the optimum PEG supporting matrix candidate, showing an attractive honeycomb-like microstructure. Calcination above 1300 degrees C results in the destruction of the shape. BPC/PEG c-PCMs are synthesized via a vacuum impregnation approach. PEG equally distributed in the matrix material with a mass fraction of 85.36% approximately and it could keep its morphological stability after heating at 80 degrees C for 40 h. Moreover, the highest thermal conductivity is 4.5 W/m K, which is about 10 times higher than the pristine PEG. Furthermore, no chemical interaction is found between the PEG and BPC. The melting and solidifying temperature, and enthalpy not vary upon a 200 thermal cycles test. This confirms the excellent chemical and structure stability for c-PCMs, which are within the most promising materials in the area of building heat preservation by being clean, energy-saving and recycled materials. (C) 2017 Elsevier B.V. All rights reserved.

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第 173 条，共 321 条

标题: Material composition, pore structure and adsorption capacity of low-rank coals around the first coalification jump: A case of eastern Junggar Basin, China

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摘要: The first coalification jump (FCJ) has a significant impact on low-rank coal reservoir heterogeneity, and is of great importance for coalbed methane (CBM) development. Here, a series of experiments were performed for 10 coal samples collected from eastern Junggar Basin, to compare the material composition, pore structure and adsorption capacity of lignite and candle coal. Contrast with the candle coal, the lignite has a higher inertinite content, larger pore volume, better connectivity, and greater specific surface area (SSA). During the process of FCJ, the polycondensation of coal molecules and the compaction of coal matrix occur, leading to a rapid decline of moisture, porosity and permeability, and the cell wall in the candle coal is badly crushed with clay minerals filled from optical microscopy. In general, the larger total pore volume (1.7-300 nm, measured by N-2 adsorption) contributes to the larger SSA. The SSA of candle coal mainly comes from the contribution of micropore (< 10 nm), especially the 2-3 nm pores, while the micropore and transition pore (10-100 nm) contribute to most of SSA of lignite. However, though the SSA of the candle coal is largely lower than that of the lignite, the CH4 adsorption capacity tends to decrease from the lignite to the candle coal due to material composition difference. Low-field NMR was used to determine the pore and fracture system by analyzing the transverse relaxation time, which showed that only two obvious peaks could be identified in lignite and three peaks at about 0.25 ms, 30 ms and 200 ms are present in the candle coal. The fractal results indicate that the pore surface and complexity inside the coal increase gradually from lignite to candle coal. These observations could deepen awareness and understanding of low-rank coal reservoir heterogeneity and the influence of FCJ on reservoir property.

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标题: Visible-light-induced charge transfer pathway and photocatalysis mechanism on Bi semimetal@defective BiOBr hierarchical microspheres

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摘要: Charge transfer pathway and catalysis mechanism are two major issues in a specific catalytic reaction process. To further probe these two aspects of photocatalytic NO oxidation to address the environmental problem, Bi metal@defective BiOBr hierarchical microspheres were fabricated and used as a visible light photocatalyst. The interfacial and surface properties of Bi metal@defective BiOBr were optimized to understand the SPR effect of Bi metal and the oxygen vacancies (OVs) formed in situ. It was found that the charge transfer pathway on Bi metal@defective BiOBr has been significantly changed from that on pristine BiOBr. The Bi semimetal could act both as a charge transfer bridge and as a hot electron donor. The OVs induced the formation of an intermediate level in the band structure of BiOBr and promote O-2 activation and thus the generation of center dot O-2(-) species. Due to the synergistic effects of Bi metal and OVs, Bi metal@defective BiOBr demonstrated highly enhanced visible light photocatalytic performance for NO removal. The photocatalytic NO oxidation process has been monitored by in situ diffuse reflectance infrared Fourier transform spectroscopy (DRIFTS), which could reveal the reaction intermediate products accurately. On the basis of an investigation with in situ DRIFTS and the simulation of the electronic structure, a new photocatalysis mechanism involving Bi metal, OVs, and NO transformation was proposed. The perspectives on the charge transfer pathway and photocatalysis mechanism in the present work can be extended to other catalysts for tuning the interfacial properties and enhancing the photocatalytic performance to address environmental problems. (C) 2017 Elsevier Inc. All rights reserved.

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第 175 条，共 321 条

标题: Building Extraction in Very High Resolution Remote Sensing Imagery Using Deep Learning and Guided Filters

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摘要: Very high resolution (VHR) remote sensing imagery has been used for land cover classification, and it tends to a transition from land-use classification to pixel-level semantic segmentation. Inspired by the recent success of deep learning and the filter method in computer vision, this work provides a segmentation model, which designs an image segmentation neural network based on the deep residual networks and uses a guided filter to extract buildings in remote sensing imagery. Our method includes the following steps: first, the VHR remote sensing imagery is preprocessed and some hand-crafted features are calculated. Second, a designed deep network architecture is trained with the urban district remote sensing image to extract buildings at the pixel level. Third, a guided filter is employed to optimize the classification map produced by deep learning; at the same time, some salt-and-pepper noise is removed. Experimental results based on the Vaihingen and Potsdam datasets demonstrate that our method, which benefits from neural networks and guided filtering, achieves a higher overall accuracy when compared with other machine learning and deep learning methods. The method proposed shows outstanding performance in terms of the building extraction from diversified objects in the urban district.

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第 176 条，共 321 条

标题: Shape-, size- and structure-controlled synthesis and biocompatibility of iron oxide nanoparticles for magnetic theranostics

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摘要: In the past decade, iron oxide nanoparticles (IONPs) have attracted more and more attention for their excellent physicochemical properties and promising biomedical applications. In this review, we summarize and highlight recent progress in the design, synthesis, biocompatibility evaluation and magnetic theranostic applications of IONPs, with a special focus on cancer treatment. Firstly, we provide an overview of the controlling synthesis strategies for fabricating zero-, one- and three-dimensional IONPs with different shapes, sizes and structures. Then, the in vitro and in vivo biocompatibility evaluation and biotranslocation of IONPs are discussed in relation to their chemo-physical properties including particle size, surface properties, shape and structure. Finally, we also highlight significant achievements in magnetic theranostic applications including magnetic resonance imaging (MRI), magnetic hyperthermia and targeted drug delivery. This review provides a background on the controlled synthesis, biocompatibility evaluation and applications of IONPs as cancer theranostic agents and an overview of the most up-to-date developments in this area.

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标题: Single-unit-cell layer established Bi2WO6 3D hierarchical architectures: Efficient adsorption, photocatalysis and dye-sensitized photoelectrochemical performance

作者: Huang, HW (Huang, Hongwei); Cao, RR (Cao, Ranran); Yu, SX (Yu, Shixin); Xu, K (Xu, Kang); Hao, WC (Hao, Weichang); Wang, YG (Wang, Yonggang); Dong, F (Dong, Fan); Zhang, TR (Zhang, Tierui); Zhang, YH (Zhang, Yihe)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 219 页: 526-537 DOI: 10.1016/j.apcatb.2017.07.084 出版年: DEC 15 2017

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摘要: Single-layer catalysis sparks huge interests and gains widespread attention owing to its high activity. Simultaneously, three-dimensional (3D) hierarchical structure can afford large surface area and abundant reactive sites, contributing to high efficiency. Herein, we report an absorbing single-unit-cell layer established Bi2WO6 3D hierarchical architecture fabricated by a sodium dodecyl benzene sulfonate (SDBS)-assisted assembled strategy. The DBS- long chains can adsorb on the (Bi2O2)(2+) layers and hence impede stacking of the layers, resulting in the single-unit-cell layer. We also uncovered that SDS with a shorter chain is less effective than SDBS. Due to the sufficient exposure of surface O atoms, single-unit-cell layer 3D Bi2WO6 shows strong selectivity for adsorption on multiform organic dyes with different charges. Remarkably, the single-unit-cell layer 3D Bi2WO6 casts profoundly enhanced photodegradation activity and especially a superior photocatalytic H-2 evolution rate, which is 14-fold increase in contrast to the bulk Bi2WO6. Systematic photoelectrochemical characterizations disclose that the substantially elevated carrier density and charge separation efficiency take responsibility for the strengthened photocatalytic performance. Additionally, the possibility of single-unit-cell layer 3D Bi2WO6 as dye-sensitized solar cells (DSSC) has also been attempted and it was manifested to be a promising dye-sensitized photoanode for oxygen evolution reaction (ORR). Our work not only furnish an insight into designing single-layer assembled 3D hierarchical architecture, but also offer a multi-functional material for environmental and energy applications. (C) 2017 Elsevier B.V. All rights reserved.

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第 178 条，共 321 条

标题: Well-designed 3D ZnIn2S4 nanosheets/TiO2 nanobelts as direct Z-scheme photocatalysts for CO2 photoreduction into renewable hydrocarbon fuel with high efficiency

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来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 219 页: 611-618 DOI: 10.1016/j.apcatb.2017.08.016 出版年: DEC 15 2017

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摘要: A 3-dimensional (3D) ZnIn2S4/TiO2 Z-scheme system has been designed and constructed for photocatalytic reduction of CO2 into renewable hydrocarbon fuels without the use of a solid-state electron mediator. The unique 3D morphology, achieved by assembling 2D ZnIn2S4 nanosheets onto 1D TiO2 nanobelts, not only provides large surface area but also improves the separation and transfer efficiency of photogenerated electrons and holes. The 3D ZnIn2S4/TiO2 Z-scheme photocatalysts show excellent light-harvesting properties demonstrated in photocatalytic reduction of CO2, resulting in generation of desired hydrocarbons. The CH4 production rate of the 3D ZnIn2S4/TiO2 can reach up to 1.135 mu mol g(-1) h(-1) which is about 39-times higher than that of bare ZnIn2S4 (0.029 mu mol g(-1) h(-1)). The enhanced photocatalytic activity is attributed to effective separation of the charge carriers between ZnIn2S4 and TiO2 through the direct Z-scheme instead of a type-II heterojunction. The photogenerated electrons in TiO2 nanobelts recombine with the holes in ZnIn2S4 nanosheets, and the unrecombined electrons/holes on different active sites have stronger reduction/oxidation abilities, leading to higher photocatalytic activity for CO2 reduction. (C) 2017 Published by Elsevier B.V.

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第 179 条，共 321 条

标题: Nonaqueous Hybrid Lithium-Ion and Sodium-Ion Capacitors

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来源出版物: ADVANCED MATERIALS 卷: 29 期: 46 文献号: 1702093 DOI: 10.1002/adma.201702093 出版年: DEC 13 2017

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摘要: Hybrid metal-ion capacitors (MICs) (M stands for Li or Na) are designed to deliver high energy density, rapid energy delivery, and long lifespan. The devices are composed of a battery anode and a supercapacitor cathode, and thus become a tradeoff between batteries and supercapacitors. In the past two decades, tremendous efforts have been put into the search for suitable electrode materials to overcome the kinetic imbalance between the batterytype anode and the capacitor-type cathode. Recently, some transition-metal compounds have been found to show pseudocapacitive characteristics in a nonaqueous electrolyte, which makes them interesting high-rate candidates for hybrid MIC anodes. Here, the material design strategies in Li-ion and Na-ion capacitors are summarized, with a focus on pseudocapacitive oxide anodes (Nb2O5, MoO3, etc.), which provide a new opportunity to obtain a higher power density of the hybrid devices. The application of Mxene as an anode material of MICs is also discussed. A perspective to the future research of MICs toward practical applications is proposed to close.

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标题: Reconstruction of northeast Asian deformation integrated with western Pacific plate subduction since 200 Ma

作者: Liu, SF (Liu, Shaofeng); Gurnis, M (Gurnis, Michael); Ma, PF (Ma, Pengfei); Zhang, B (Zhang, Bo)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 175 页: 114-142 DOI: 10.1016/j.earscirev.2017.10.012 出版年: DEC 2017

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摘要: The configuration and kinematics of continental deformation and its marginal plate tectonics on the Earth's surface are intrinsic manifestations of plate-mantle coupling. The complex interactions of plate boundary forces result in plate motions that are dominated by slab pull and ridge push forces and the effects of mantle drag; these interactions also result in continental deformation with a complex basin-mountain architecture and evolution. The kinematics and evolution of the western Pacific subduction and northeast Asian continental-margin deformation represent a first-order tectonic process whose nature and chronology remains controversial. This paper implements a "deep-time" reconstruction of the western Pacific subduction, continental accretion or collision and basin-mountain deformation in northeast Asia since 200 Ma based on a newly revised global plate model. We use GPlates software to examine strain recovery, geological and seismic tomography constraints for the western Pacific plate subduction, and sequentially backward rotations of deforming features. The results indicate a NW-SE-oriented shortening from 200 to 137 Ma, a NWW SEE-oriented extension from 136 to 101 Ma, a nearly N-S-oriented extension and uplift with a short-term NWW SEE-oriented compressional inversion in northeast China from 100 to 67 Ma, and a NW-SE- and nearly N-S-oriented extension from 66 Ma to the present day. The western Pacific oceanic plate subducted forward under East Asia along Mudanjiang-Honshu Island during the Jurassic, and the trenches retreated to the Sikhote-Alin, North Shimanto, and South Shimanto zones from ca. 137-128 Ma, ca. 130-90 Ma, and in ca. 60 Ma, respectively. Our time-dependent analysis of plate motion and continental deformation coupling suggests that the multi-plate convergent motion and ocean-continent convergent orogeny were induced,by advance subduction during the Jurassic and earliest Cretaceous. Our analysis also indicates that intra-continent rifting and back-arc extension were triggered by trench retreat during the Cretaceous and that the subduction of the oceanic ridge and arc were triggered by trench retreat during the Cenozoic. Therefore, reconstructing the history of plate motion and subduction and tracing the geological and deformation records in continents play a significant role in revealing the effects of complex plate motions and the interactions of plate boundary forces on plate-mantle coupling and plate motion-intracontinental deformation coupling.

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标题: Oxygen Vacancy Promoted Heterogeneous Fenton-like Degradation of Ofloxacin at pH 3.2-9.0 by Cu Substituted Magnetic Fe3O4@FeOOH Nanocomposite

作者: Jin, H (Jin, Hang); Tian, XK (Tian, Xike); Nie, YL (Nie, Yulun); Zhou, ZX (Zhou, Zhaoxin); Yang, C (Yang, Chao); Li, Y (Li, Yong); Lu, LQ (Lu, Liqiang)

来源出版物: ENVIRONMENTAL SCIENCE & TECHNOLOGY 卷: 51 期: 21 页: 12699-12706 DOI: 10.1021/acs.est.7b04503 出版年: NOV 7 2017

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摘要: To develop an ultraefficient and reusable heterogeneous Fenton-like catalyst at a wide working pH range is a great challenge for its application in practical water treatment. We report an oxygen vacancy promoted heterogeneous Fenton-like reaction mechanism and an unprecedented ofloxacin (OFX) degradation efficiency of Cu doped Fe3O4@FeOOH magnetic nanocomposite. Without the aid of external energy, OFX was always completely removed within 30 min at pH 3.2-9.0. Compared with Fe3O4@ FeOOH, the pseudo-first-order reaction constant was enhanced by 10 times due to Cu substitution (9.04/h vs 0.94/h). Based on the X-ray photoelectron spectroscopy (XPS), Raman analysis, and the investigation of H2O2 decomposition, (OH)-O-center dot generation, pH effect on OFX removal and H2O2 utilization efficiency, the new formed oxygen vacancy from in situ Fe substitution by Cu rather than promoted Fe3+/Fe2+ cycle was responsible for the ultraefficiency of Cu doped Fe3O4@FeOOH at neutral and even alkaline pHs. Moreover, the catalyst had an excellent long-term stability and could be easily recovered by magnetic separation, which would not cause secondary pollution to treated water.

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第 182 条，共 321 条

标题: An extended reciprocally convex matrix inequality for stability analysis of systems with time-varying delay

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, Lin); Wu, M (Wu, Min); Wang, QG (Wang, Qing-Guo)

来源出版物: AUTOMATICA 卷: 85 页: 481-485 DOI: 10.1016/j.automatica.2017.07.056 出版年: NOV 2017

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摘要: The reciprocally convex combination lemma (RCCL) is an important technique to develop stability criteria for the systems with a time-varying delay. This note develops an extended reciprocally convex matrix inequality, which reduces the estimation gap of the RCCL-based matrix inequality and reduces the number of decision variables of the recently proposed delay-dependent RCCL. A stability criterion of a linear time delay system is established through the proposed matrix inequality. Finally, a numerical example is given to demonstrate the advantage of the proposed method. (C) 2017 Elsevier Ltd. All rights reserved.

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标题: Coal pore size distributions controlled by the coalification process: An experimental study of coals from the Junggar, Ordos and Qinshui basins in China

作者: Li, Y (Li, Yong); Zhang, C (Zhang, Cheng); Tang, DZ (Tang, Dazhen); Gan, Q (Gan, Quan); Niu, XL (Niu, Xinlei); Wang, K (Wang, Kai); Shen, RY (Shen, Ruiyang)

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摘要: Various sizes of pores in coal, which are generally formed by organic matter during the coalification process, have a direct influence on coalbed methane extraction. However, few studies have investigated the pore size distributions across the thermal evolution of coal from peat to anthracite. In this project, three series of coal samples collected from three key CBM development basins with graded vitrinite reflectance values (R-o), the eastern Junggar basin (R-o of approximately 0.5%), eastern Ordos basin (R-o of approximately 2.2%) and southern Qinshui basin (R-o of approximately 3.0%), were systematically characterized by optical observations, low-temperature nitrogen adsorption/desorption, and nuclear magnetic resonance (NMR) methods. The average pore radius calculated by the Brunauer-Emmett-Teller (BET) method shows that the low-rank (L) series (averaging 14.17 nm) has values higher than either the middle-rank (M, 12.70 nm) or high-rank (H, 12.66 nm) samples. Bright and semi-bright coals (determined by the overall relative lustre and percentage of bright components) are generally distributed with relatively higher pore radii (averaging 16.86 nm for all 3 series) than the semi-dull and dull coals (9.50 nm). The range of pore sizes decreases as the coal rank increases, and the NMR transverse relaxation (T-2) spectrum decreases from bi-modal and tri-modal (M and L series) to unimodal curves (H series). However, the pore surfaces and complexity inside the coal increase with the coal rank, with the fractal results showing a three-stage fitting slope of the H series compared with the M (two-stage) and L (one-stage) coals. The observations are generally caused by the L coals, which mainly include plant tissue pores, while the M series coals are characterized by circle-shaped tissue pores and gas pores. The H series of flattened tissue pores and more diverse gas pores are identified in the higher-rank coals. Combined with the thermogenic gas generation process of coal, three key transition points were recognized: (1) R-o of approximately 0.5%, transition of dehydration to bituminization with coals being much more compacted, shown as the > 100 nm range pores decreasing sharply; (2) R-o of appximately 1.2%, the beginning of the debituminization stage with the intensive generation of thermogenic gas, with pores ranging between 10 and 50 nm increasing quickly; and (3) Ro of approximately 1.9%, coal being transformed into anthracite, becoming much more compacted with the induction of cleats/fractures, shown as another decrease in > 100 nm range pores but an increase in 50-100 nm range pores. These observations could deepen the understanding of the complex pore size distribution differences between different coal ranks and the impact of the thermal evolution on the coal heterogeneity and its reservoir characteristics. (C) 2017 Elsevier Ltd. All rights reserved.

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第 184 条，共 321 条

标题: Knowledge sharing motivations in online health communities: A comparative study of health professionals and normal users

作者: Zhang, X (Zhang, Xing); Liu, S (Liu, Shan); Deng, ZH (Deng, Zhaohua); Chen, X (Chen, Xing)

来源出版物: COMPUTERS IN HUMAN BEHAVIOR 卷: 75 页: 797-810 DOI: 10.1016/j.chb.2017.06.028 出版年: OCT 2017

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摘要: The effect of motivations on knowledge sharing behavior has been extensively investigated in various online communities. However, this topic is rarely examined in the context of online health communities (OHCs). Furthermore, the difference in the motivations of sharing knowledge between two types of members in OHCs - health professionals and normal users, is never examined. The present study models and examines both the extrinsic (reputation and reciprocity) and intrinsic (knowledge self-efficacy, altruism, and empathy) motivations of health professionals and normal users. The hypotheses derived from the research model were empirically validated using an online survey of 443 members of three famous online health communities in China. Results show that reciprocity and altruism positively affect the knowledge sharing intention of both health professionals and normal users. Moreover, reputation and knowledge self-efficacy have a greater influence on the knowledge sharing intentions of health professionals than normal users; whereas reciprocity, altruism, and empathy have a greater influence on the knowledge sharing intentions of normal users than health professionals. These new findings expand our understanding on the motivations that may affect knowledge sharing intentions in the context of OHCs. (C) 2017 Elsevier Ltd. All rights reserved.

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标题: Environmental and human health challenges of industrial livestock and poultry farming in China and their mitigation

作者: Hu, YA (Hu, Yuanan); Cheng, HF (Cheng, Hefa); Tao, S (Tao, Shu)

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Web of Science 核心合集中的 "被引频次": 225

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摘要: Driven by the growing demand for food products of animal origin, industrial livestock and poultry production has become increasingly popular and is on the track of becoming an important source of environmental pollution in China. Although concentrated animal feeding operations (CAFOs) have higher production efficiency and profitability with less resource consumption compared to the traditional family-based and "free range" farming, they bring significant environmental pollution concerns and pose public health risks. Gaseous pollutants and bioaerosols are emitted directly from CAFOs, which have health implications on animal producers and neighboring communities. A range of pollutants are excreted with the animal waste, including nutrients, pathogens, natural and synthetic hormones, veterinary antimicrobials, and heavy metals, which can enter local farmland soils, surface water, and groundwater, during the storage and disposal of animal waste, and pose direct and indirect human health risks. The extensive use of antimicrobials in CAFOs also contributes to the global public health concern of antimicrobial resistance (AMR). Efforts on treating the large volumes of manure generated in CAFOs should be enhanced (e.g., by biogas digesters and integrated farm systems) to minimize their impacts on the environment and human health. Furthermore, the use of veterinary drugs and feed additives in industrial livestock and poultry farming should be controlled, which will not only make the animal food products much safer to the consumers, but also render the manure more benign for treatment and disposal on farmlands. While improving the sustainability of animal farming, China also needs to promote healthy food consumption, which not only improves public health from avoiding high-meat diets, but also slows down the expansion of industrial animal farming, and thus reduces the associated environmental and public health risks.

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ESI 热点论文: N

输出日期: 2023-09-04

第 186 条，共 321 条

标题: The Columbia supercontinent revisited

作者: Meert, JG (Meert, Joseph G.); Santosh, M (Santosh, M.)

来源出版物: GONDWANA RESEARCH 卷: 50 特刊: SI 页: 67-83 DOI: 10.1016/j.gr.2017.04.011 出版年: OCT 2017

Web of Science 核心合集中的 "被引频次": 173

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摘要: Just over 15 years ago, a proposal forwarded by Rogers and Santosh (2002) posited the existence of a pre-Rodinia supercontinent which they called Columbia. The conjecture invigorated research into the Paleo-Mesoproterozoic interval that was; in our opinion, inappropriately dubbed 'the boring billion'. Given the wealth of new information about the supercontinent, this review paper takes a careful look at the paleomagnetic evidence that is used to reconstruct Columbia. Our contribution represents a status report and indicates that; despite the exponential increase in available data, knowledge of the assembly, duration and breakup history of the supercontinent are contentious. The commonality of similar to 1.7-2.1 Ga orogenic systems around the globe are indicative of major changes in paleogeography and growth of larger landmasses. There is continued discussion about the interconnectedness of those orogenic systems in a global picture. Arguments for Columbia posit a similar to 1500-1400 Ma age for maximum packing. Paleomagnetic data from many of the constituent cratons during the 1500-1400 Ma interval can be interpreted to support a large landmass, but the consistency of the proposal cannot be reliably demonstrated for earlier or later times. One of the more intriguing advances are the apparent long-lived connections between Laurentia, Siberia and Baltica that may have formed the core of both Columbia and Rodinia. (C) 2017 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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输出日期: 2023-09-04

第 187 条，共 321 条

标题: Tectonic evolution, superimposed orogeny, and composite metallogenic system in China

作者: Deng, J (Deng, Jun); Wang, QF (Wang, Qingfei); Li, GJ (Li, Gongjian)

来源出版物: GONDWANA RESEARCH 卷: 50 特刊: SI 页: 216-266 DOI: 10.1016/j.gr.2017.02.005 出版年: OCT 2017

Web of Science 核心合集中的 "被引频次": 222

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摘要: Continental China is a mosaic of numerous tectonic blocks, which amalgamated from Neoarchean to Cenozoic broadly coeval with the cycles of global supercontinents such as Kenorland, Columbia, Rodinia, Gondwana, and Pangaea. By reviewing the long-lasting geological evolution in the different tectonic blocks, it reveals that more than two episodes of tectonic events, including accretionary and collisional orogeny, and dismantling, as well as mantle plume, occurred successively or simultaneously within a single tectonic belt. This is called superimposed orogeny in this study. Examples of the dominant types of superimposed orogeny in China include: (1) Cenozoic continental collision superimposed on Paleo- to Mesozoic accretionary orogeny in the Tibet and Sanjiang orogenic belts; (2) Reactivation of Paleozoic accretionary orogen in later Mesozoic oceanic subduction in the eastern part of Qinling-Qilian-Kunlun and Central Asian orogenic belts; (3) Mesozoic oceanic subduction under the paleo-suture in the South China Block; (4) Mesozoic demantling along the Paleo- and Neoproterozoic, and Paleozoic sutures in the eastern part of North China Craton; and (5) mantle plume rising through metasomatized lithospheric mantle or stagnant oceanic slab in the Emeishan large igneous province. A comprehensive review of the spatial-temporal distribution of ore deposits and their salient features shows that the superimposed orogeny has exerted significant control on metallogeny in China. The giant porphyry and skarnore deposits, as well as orogenic gold deposits were preferentially formed along previous tectonic suture, craton margin, and arc during later orogenesis due to the remobilization of previously enriched metals. Superimposed orogeny has reworked the lithospheric structure with concomitant granitoid-associated metallogeny. The mixing of magmas from juvenile lower crust, ancient lower crust, and middle crust, which tends to induce the different mineralization of Cu-Au, Mo, and Pb-Zn-W-Sn deposits respectively, was considered to generate a wide variety of combinations of metal species. The superimposed orogeny caused the overlapping of diverse genetic types of deposit formed in different tectonic periods in the same tectono-metallogenic belt. The stratiform ore deposit, including BIF, VMS, SEDEX, or sedimentary sulfide layers, formed from Neoarchean to Paleozoic, were modified by later mineralization, resulting in the enrichment of the various metal species and enhancement of ore resources. This study brings up the concept of composite metallogenic system to summarize the regional metallogeny driven by superimposed orogeny. The composite metallogenic system was dominantly characterized by the multi-episodic and diverse mineralization concomitant with one or more features, including mineralization evolved from the previous metal enrichment, later overlapping or modification on previous ore belt, and diversifying of metal species derived from reworked lithosphere. (C) 2017 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 188 条，共 321 条

标题: Notes on Stability of Time-Delay Systems: Bounding Inequalities and Augmented Lyapunov-Krasovskii Functionals

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, Lin); Wu, M (Wu, Min)

来源出版物: IEEE TRANSACTIONS ON AUTOMATIC CONTROL 卷: 62 期: 10 页: 5331-5336 DOI: 10.1109/TAC.2016.2635381 出版年: OCT 2017

Web of Science 核心合集中的 "被引频次": 213

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摘要: The bounding inequalities and the LyapunovKrasovskii functionals (LKFs) are important for the stability analysis of time-delay systems. Much attention has been paid to develop tighter inequalities for improving stability criteria, while the contribution of the LKFs has not been considered when discussing the relationship between the tightness of inequalities and the conservatism of criteria. This note is concerned with this issue. Firstly, it is proved that, when a simple LKF is applied, the stability criteria obtained by the Wirtinger-based inequality and the Jensen inequality are equivalent although the Wirtinger-based inequality is tighter. It means that the tighter inequality does not always lead to a less conservative criterion. Secondly, it is found that a suitable augmented LKF with necessary integral vectors in its derivative is required to achieve the advantage of the Wirtingerbased inequality. Based on this observation, two delay-producttype terms are introduced into the LKF to establish new stability criteria. Finally, a numerical example is given to verify the equivalence statements and to show the benefit of the proposed criteria.

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第 189 条，共 321 条

标题: Stability Analysis of Discrete-Time Neural Networks With Time-Varying Delay via an Extended Reciprocally Convex Matrix Inequality

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, Lin); Wang, QG (Wang, Qing-Guo); Wu, M (Wu, Min)

来源出版物: IEEE TRANSACTIONS ON CYBERNETICS 卷: 47 期: 10 特刊: SI 页: 3040-3049 DOI: 10.1109/TCYB.2017.2665683 出版年: OCT 2017

Web of Science 核心合集中的 "被引频次": 190

被引频次合计: 191

摘要: This paper is concerned with the stability analysis of discrete-time neural networks with a time-varying delay. Assessment of the effect of time delays on system stability requires suitable delay-dependent stability criteria. This paper aims to develop new stability criteria for reduction of conservatism without much increase of computational burden. An extended reciprocally convex matrix inequality is developed to replace the popular reciprocally convex combination lemma (RCCL). It has potential to reduce the conservatism of the RCCL-based criteria without introducing any extra decision variable due to its advantage of reduced estimation gap using the same decision variables. Moreover, a delay-product-type term is introduced for the first time into the Lyapunov function candidate such that a delay-variation-dependent stability criterion with the bounds of delay change rate is established. Finally, the advantages of the proposed criteria are demonstrated through two numerical examples.

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第 190 条，共 321 条

标题: Macroscopic Polarization Enhancement Promoting Photo- and Piezoelectric-Induced Charge Separation and Molecular Oxygen Activation

作者: Huang, HW (Huang, Hongwei); Tu, SC (Tu, Shuchen); Zeng, C (Zeng, Chao); Zhang, TR (Zhang, Tierui); Reshak, AH (Reshak, Ali H.); Zhang, YH (Zhang, Yihe)

来源出版物: ANGEWANDTE CHEMIE-INTERNATIONAL EDITION 卷: 56 期: 39 页: 11860-11864 DOI: 10.1002/anie.201706549 出版年: SEP 18 2017

Web of Science 核心合集中的 "被引频次": 761

被引频次合计: 767

摘要: Efficient photo- and piezoelectric-induced molecular oxygen activation are both achieved by macroscopic polarization enhancement on a noncentrosymmetric piezoelectric semiconductor BiOIO3. The replacement of V5+ ions for I5+ in IO3 polyhedra gives rise to strengthened macroscopic polarization of BiOIO3, which facilitates the charge separation in the photocatalytic and piezoelectric catalytic process, and renders largely promoted photo- and piezoelectric induced reactive oxygen species (ROS) evolution, such as superoxide radicals (O-.(2)-) and hydroxyl radicals ((OH)-O-.). This work advances piezoelectricity as a new route to efficient ROS generation, and also discloses macroscopic polarization engineering on improvement of multi-responsive catalysis.

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输出日期: 2023-09-04

第 191 条，共 321 条

标题: Self-assembly of exfoliated molybdenum disulfide (MoS2) nanosheets and layered double hydroxide (LDH): Towards reducing fire hazards of epoxy

作者: Zhou, KQ (Zhou, Keqing); Gao, R (Gao, Rui); Qian, XD (Qian, Xiaodong)

来源出版物: JOURNAL OF HAZARDOUS MATERIALS 卷: 338 页: 343-355 DOI: 10.1016/j.jhazmat.2017.05.046 出版年: SEP 15 2017

Web of Science 核心合集中的 "被引频次": 174

被引频次合计: 178

摘要: In present study, LDH/MoS2 hybrids were facilely prepared by self-assembly of exfoliated MoS2 nanosheets and LDH via electrostatic force. The structure and morphology of the LDH/MoS2 hybrids were characterized and then introduced into epoxy for reducing its fire hazards. Compared with single MoS2, LDH/MoS2 hybrids showed a more homogeneous dispersion in the epoxy matrix and no obvious agglomerates were observed. Compared with MoS2, the addition of LDH/MoS2 hybrids endowed more excellent fire resistance to epoxy matrix, which was reflected by the significantly reduced peak heat release rate, total heat release and total smoke production. A rational flame retardant mode of action for LDH/MoS2 hybrids was proposed based on the analysis of pyrolysis fragments and char residues. (C) 2017 Elsevier B.V. All rights reserved.

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输出日期: 2023-09-04

第 192 条，共 321 条

标题: Template-free precursor-surface-etching route to porous, thin g-C3N4 nanosheets for enhancing photocatalytic reduction and oxidation activity

作者: Huang, HW (Huang, Hongwei); Xiao, K (Xiao, Ke); Tian, N (Tian, Na); Dong, F (Dong, Fan); Zhang, TR (Zhang, Tierui); Du, X (Du, Xin); Zhang, YH (Zhang, Yihe)

来源出版物: JOURNAL OF MATERIALS CHEMISTRY A 卷: 5 期: 33 页: 17452-17463 DOI: 10.1039/c7ta04639a 出版年: SEP 7 2017

Web of Science 核心合集中的 "被引频次": 291

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摘要: Metal-free graphitic carbon nitride (g-C3N4) has sparked considerable interest due to its efficient photocatalytic activity in many fields. Development of new tactics toward improving the photocatalytic performance of g-C3N4 remains active and challenging. In this study, we uncover an unprecedented template-free precursor (melamine) pre-treatment protocol to achieve porous g-C3N4 nanosheets for efficient photocatalytic reduction and oxidation reaction. The introduction of thiourea solution in the hydrothermal pre-treatment process etches the surface of melamine, thus yielding the porous, thin g-C3N4 nanosheets. The microstructure and porosity of g-C3N4 can be adjusted only by controlling the thiourea amount. The as-obtained porous g-C3N4 nanosheets are found to be endowed with not only increased specific surface area, but also enhanced photoabsorption in the visible light region. Systematic characterizations of the charge movement behavior (transient photocurrent, linear sweep voltammetry, electrochemical impedance spectra, photoluminescence and surface photovoltage spectroscopy) disclose that the separation of photogenerated charge carriers is remarkably boosted by fabricating such a porous nanosheet structure. Benefiting from these advantages, porous g-C3N4 nanosheets present profoundly enhanced visible-light photocatalytic performance for H-2 evolution (3.3-fold increase) and NO removal from the gaseous phase (5.5 times increase) in contrast to the pristine bulk g-C3N4. Our current study may offer an alternative approach to designing high-performance g-C3N4 nanomaterials for energy and environmental applications.

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第 193 条，共 321 条

标题: Investigation on the pore structure and multifractal characteristics of tight oil reservoirs using NMR measurements: Permian Lucaogou Formation in Jimusaer Sag, Junggar Basin

作者: Zhao, PQ (Zhao, Peiqiang); Wang, ZL (Wang, Zhenlin); Sun, ZC (Sun, Zhongchun); Cai, JC (Cai, Jianchao); Wang, L (Wang, Liang)

来源出版物: MARINE AND PETROLEUM GEOLOGY 卷: 86 页: 1067-1081 DOI: 10.1016/j.marpetgeo.2017.07.011 出版年: SEP 2017

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被引频次合计: 191

摘要: Pore structure is a critical parameter to estimate the reservoir quality and evaluate the resource potential. However, the pore structure and heterogeneity of the unconventional tight oil reservoirs of Permian Lucaogou Formation of Jimusaer Sag, Junggar Basin are not studied well. In this paper, the multifractal analysis based on the NMR T-2 distributions was applied to investigate the pore structure and heterogeneity. The reservoir quality index (RQI) and flow zone indicator (FZI) were calculated using porosity and permeability. Two parameters T-35 and T-50 were newly defined as relaxation times corresponding to the 35% and 50% saturation on the T-2 reverse accumulative curve, respectively. The results showed that the RQI, and FZI values were extremely low, and that the NMR T-2 distributions of water saturated samples had much short relaxation components with no or little long relaxation components, indicating a complex and poor microscopic pore structure of tight oil rocks. The typical multifractal characteristics, such as the large values of singularity strength range (Delta alpha), revealed that the pore structures of samples were strongly heterogeneous. It was also found that the clay contents have an obvious influence on the multifractal parameters, and the FZI and new defined T-35 are two good indicators for heterogeneity of pore structure. In addition, the feasibility and applicability of calculating the multifractal parameters from NMR and other well logs were discussed. (C) 2017 Elsevier Ltd. All rights reserved.

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第 194 条，共 321 条

标题: Electrical conductivity models in saturated porous media: A review

作者: Cai, JC (Cai, Jianchao); Wei, W (Wei, Wei); Hu, XY (Hu, Xiangyun); Wood, DA (Wood, David A.)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 171 页: 419-433 DOI: 10.1016/j.earscirev.2017.06.013 出版年: AUG 2017

Web of Science 核心合集中的 "被引频次": 184

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摘要: Electrical transport properties of saturated porous media, such as soils, rocks and fractured networks, typically composed of a non-conductive solid matrix and a conductive brine in the pore space, have numerous applications in reservoir engineering and petrophysics. One of the widely used electrical conductivity models is the empirical Archie's law that has a practical application in well-log interpretation of reservoir rocks. The Archie equation does not take into account the contributions of clay minerals, isolated porosity, heterogeneity in grains and pores and their distributions, as well as anisotropy. In the literature, either some modifications were presented to apply Archie's law to tight and clay-rich reservoirs or more modern models were developed to describe electrical conductivity in such reservoirs. In the former, a number of empirically derived parameters were proposed, which typically vary from one reservoir to another. In the latter, theoretical improvements by including detailed characteristics of pore space morphology led to developing more complex electrical conductivity models. Such models enabled us to address the electrical properties in a wider range of potential reservoir rocks through theoretical parameters related to key reservoir-defining petrophysical properties. This paper presents a review of the electrical conductivity models developed using fractal, percolation and effective medium theories. Key results obtained by comparing experiential and theoretical models with experiments/simulations, as well as advantages and drawbacks of each model are analyzed. Approaches to obtaining more reasonable electrical conductivity models are discussed. Experiments suggest more complex relationships between electrical conductivity and porosity than experiential models, particularly in low-porosity formations. However, the available theoretical models combined with simulations do provide insight to how microscale physics affects macroscale electrical conductivity in porous media.

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第 195 条，共 321 条

标题: A new looped-functional for stability analysis of sampled-data systems

作者: Zeng, HB (Zeng, Hong -Bing); Teo, KL (Teo, Kok Lay); He, Y (He, Yong)

来源出版物: AUTOMATICA 卷: 82 页: 328-331 DOI: 10.1016/j.automatica.2017.04.051 出版年: AUG 2017

Web of Science 核心合集中的 "被引频次": 231

被引频次合计: 246

摘要: In this paper, a new two-sided looped-functional is introduced for stability analysis of sampled-data systems. The functional fully utilizes the information on both the intervals x(t) to x(t(k)) and x(t) to x(t(k+1)). Based on the two-sided functional, an improved stability condition is derived in the form of linear matrix inequality (LMI). Numerical examples show that the result computed by the presented condition approximates nearly the theoretical bound (bound obtained by eigenvalue analysis) and outperforms substantially others in the existing literature. (C) 2017 Elsevier Ltd. All rights reserved.

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第 196 条，共 321 条

标题: Sediment accumulation and budget in the Bohai Sea, Yellow Sea and East China Sea

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摘要: Sediment accumulation and budget in the continental margins provides abundant information of source-sink processes from the land to the sea, including weathering, human activities and sedimentary environment. Here we show the distribution of mud areas, modem sedimentation rates and sediment budget in the Bohai Sea, Yellow Sea and East China Sea. Using grain size data of > 18,000 surface sediment samples and Pb-210 data, from 413 sites, we identify five areas with sediments mainly composed of fine-grained fractions (mean grain size > 6 cp) and find a relatively high sedimentation rates of > 1.5 mm/yr in the mud areas. Near the Yellow and Yangtze River deltas sedimentation reaches > 95.0 mm/yr. Approximately 1185.4 x 10(6) tons of fine-grained sediment accumulate annually in the mud areas of the east China seas. Atmospheric deposition contributes < 2% (18.37 x 10(6) tons/yr), while the riverine sediment inputs account for > 75% (917 x 10(6) tons/yr). The remainder comes from all other sources including coastal erosion and resuspension of bottom sediments. In addition, similar to 45% of the fluvial sediment supply deposits on the subaerial delta, similar to 40-50% is trapped on the subaqueous delta and shelf, and the remainder < 5% escapes the shelf edge. The results will be a strong foundation for understanding of the transport, deposit and preservation of sediment and other relevant material (e.g. carbon and nutrient etc.) of terrestrial materials in the sea.

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第 197 条，共 321 条

标题: Precursor-reforming protocol to 3D mesoporous g-C3N4 established by ultrathin self-doped nanosheets for superior hydrogen evolution

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摘要: Graphitic carbon nitride (g-C3N4) has attracted enormous research attention as a promising low cost, visible-light driven semiconductor photocatalyst. However, low photoabsorption efficiencies and unsatisfactory charge separation limit the potential of g-C3N4 in many applications, motivating attempts to manipulate the structure and electronic properties of g-C3N4 to achieve improved performance. Here we describe a novel precursor-reforming strategy that ultimately affords 3D mesoporous ultrathin g-C3N4 with superior photocatalytic performance compared to conventional calcination-derived g-C3N4. We demonstrate that during hydrothermal treatment of melamine and urea, melamine undergoes an irreversible monoclinic to orthorhombic phase transformation, and the additive urea (excess typically 3-fold) serves as an additional N source and porogen. Calcination of the orthorhombic melamine yields mesoporous g-C3N4 with enhanced photoabsorption properties and an outstanding photoactivity. A 23-fold increased hydrogen evolution rate of 3579 mu mol h(-1) g(-1) (lambda > 420 nm) was achieved with an apparent quantum efficiency (AQE) of 27.8% at 420 +/- 15 nm, a level of performance far beyond any AQE previously reported for ultrathin/porous/doped g-C3N4 photocatalyst. Our work conclusively demonstrates a new synthetic strategy towards high performance g-C3N4-based photocatalytic materials for energy applications.

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第 198 条，共 321 条

标题: High-resolution magnetostratigraphic study of the Paleogene-Neogene strata in the Northern Qaidam Basin: Implications for the growth of the Northeastern Tibetan Plateau

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摘要: The Cenozoic terrestrial, intermontane Qaidam Basin on the northeastern edge of the Tibetan Plateau contains >12 km of sedimentary rocks that potentially document the accommodation of India-Asia convergence and the growth of the plateau. The chronology remains incomplete, hindering cross-basin correlation between lithostratigraphic units and their further interpretation. Here we present a high-resolution magnetostratigraphy spanning >5 km of Paleogene-Neogene sequence at Dahonggou in the Northern Qaidam Basin. Based on correlation with the geomagnetic polarity time scale (GPTS), we have dated the section to being between similar to 52 and similar to 7 Ma. The bottom conglomeratic unit, ranging from >52 Ma to similar to 44 Ma, was deposited in high-energy environments (e.g., alluvial fan or braided river), reflecting the earliest deformation and uplift of the basin-bounding Qilian Shan fold-thrust belt in response to India-Asia collision. In addition, we identified two major increases in sedimentation rate at 25-16 Ma and after similar to 9.5 Ma and three phases of lesser increases at 52-44 Ma, 38-33 Ma, and 14.6-12.0 Ma. These increases in sedimentation rate are consistent with regional thermochronology and basin analysis studies, which revealed enhanced motion on basin-bounding thrust faults. We argue that these accelerated sedimentation rates indicate pulsed tectonism in the northeastern Tibetan Plateau. The pulse at 25-16 Ma may further relate to phases of strong rainfall linked to an intense monsoon at that time. (C) 2017 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 199 条，共 321 条

标题: 3D-3D porous Bi2WO6/graphene hydrogel composite with excellent synergistic effect of adsorption-enrichment and photocatalytic degradation

作者: Yang, JJ (Yang, Jinjin); Chen, DM (Chen, Daimei); Zhu, Y (Zhu, Yi); Zhang, YM (Zhang, Yuanming); Zhu, YF (Zhu, Yongfa)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 205 页: 228-237 DOI: 10.1016/j.apcatb.2016.12.035 出版年: MAY 15 2017

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摘要: A novel visible-light 3D-3D Bi2WO6/graphene hydrogel (BWO/GH) photocatalyst with the synergistic effect of adsorption and photocatalysis has been successfully synthesized by a facile one-step hydrothermal method and is applied in environment remediation. 3D porous graphene hydrogel, in which 3D-structured flower-like BWO as an efficient photocatalyst is homogenously distributed, not only exhibits the great absorption toward the organic pollution, but also provides multidimensional quality and electron transfer channels. The 3D-3D structure of BWO/GH composite is beneficial to light refraction and reflection, which highly improves the utilization rate of light. The synergistic effect of the 3D-3D BWO/GH composite greatly enhanced the removal rates of organic pollutants and it is ease of separation and recycling in water purification. The removal rate of methylene blue (MB) by BWO/GH composite is about 2.3 times as that of the pure BWO in static systems, and the removal rates of MB and 2, 4-dichlorophenol (2, 4-CDP) are about 1.3 and 3 times as these of the pure BWO in dynamic system. When the irradiation time lasted for 74h, the removal rate of MB is nearly unchanged and still kept at 36.1%, indicating that the 3D BWO/GH composite has a high stability. The construction of BWO/GH composite resolved the adsorption saturation problem of GH and improved the photocatalytic activity of BWO, thus greatly improved the removal rate of water pollutants. (C) 2016 Elsevier B.V. All rights reserved.

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第 200 条，共 321 条

标题: Learning from class-imbalanced data: Review of methods and applications

作者: Guo, HX (Guo Haixiang); Li, YJ (Li Yijing); Shang, J (Shang, Jennifer); Gu, MY (Gu Mingyun); Huang, YY (Huang Yuanyue); Bing, G (Bing, Gong)

来源出版物: EXPERT SYSTEMS WITH APPLICATIONS 卷: 73 页: 220-239 DOI: 10.1016/j.eswa.2016.12.035 出版年: MAY 1 2017

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摘要: Rare events, especially those that could potentially negatively impact society, often require humans' decision-making responses. Detecting rare events can be viewed as a prediction task in data mining and machine learning communities. As these events are rarely observed in daily life, the prediction task suffers from a lack of balanced data. In this paper, we provide an in depth review of rare event detection from an imbalanced learning perspective. Five hundred and seventeen related papers that have been published in the past decade were collected for the study. The initial statistics suggested that rare events detection and imbalanced learning are concerned across a wide range of research areas from management science to engineering. We reviewed all collected papers from both a technical and a practical point of view. Modeling methods discussed include techniques such as data preprocessing, classification algorithms and model evaluation. For applications, we first provide a comprehensive taxonomy of the existing application domains of imbalanced learning, and then we detail the applications for each category. Finally, some suggestions from, the reviewed papers are incorporated with our experiences and judgments to offer further research directions for the imbalanced learning and rare event detection fields. (C) 2016 Elsevier Ltd. All rights reserved.

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第 201 条，共 321 条

标题: Chlorine intercalation in graphitic carbon nitride for efficient photocatalysis

作者: Liu, CY (Liu, Chengyin); Zhang, YH (Zhang, Yihe); Dong, F (Dong, Fan); Reshak, AH (Reshak, A. H.); Ye, LQ (Ye, Liqun); Pinna, N (Pinna, Nicola); Zeng, C (Zeng, Chao); Zhang, TR (Zhang, Tierui); Huang, HW (Huang, Hongwei)

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摘要: Metal-free graphitic carbon nitride (g-C3N4) shows tremendous potentials in energy and environmental domains. Nonetheless, amelioration on the crystal configuration, electronic structure and microstructure of g-C3N4 for high-performing visible-light photocatalysis is still challenging and anticipated. Here we report the development of chlorine (Cl) intercalated g-C3N4 via co-pyrolysis of melamine and excessive ammonium chloride (excessive is very pivotal). This protocol renders not only Cl intercalation in the interlayer of g-C3N4, but also a homogeneous porous structure, thereby endowing g-C3N4 with multiple superiority effects, including significantly promoted charge migration by establishing interlayer pathway, up-shifted conduction-band level, narrowed band gap as well as enhanced surface area. The as-prepared CI intercalated mesoporous g-C3N4 parades outstanding photocatalytic performance for water splitting into H-2, CO2 reduction, liquid and air contaminants removal. The most enhanced photocatalytic performance was obtained at Cl-C3N4-3 for H-2 evolution activity, which shows a 19.2-fold increase in contrast to pristine g-C3N4, accompanying with a high apparent quantum efficiency of 11.9% at 420 +/- 15 nm. Experimental and OFT calculations results co-disclose that the aforementioned advantageous factors account for the profoundly boosted photooxidation and photoreduction capabilities of g-C3N4 under visible light. The present work may furnish a bottom-up tactic for integrally advancing g-C3N4, and also hold huge promise to be extended to other layered materials for photochemical or photoelectrochemical applications. (C) 2016 Elsevier B.V. All rights reserved.

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第 202 条，共 321 条

标题: Rational design on 3D hierarchical bismuth oxyiodides via in situ self-template phase transformation and phase-junction construction for optimizing photocatalysis against diverse contaminants

作者: Huang, HW (Huang, Hongwei); Xiao, K (Xiao, Ke); Zhang, TR (Zhang, Tierui); Dong, F (Dong, Fan); Zhang, YH (Zhang, Yihe)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 203 页: 879-888 DOI: 10.1016/j.apcatb.2016.10.082 出版年: APR 2017

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摘要: Design of three-dimensional (3D) hierarchical architectures and nano-phase-junctions are of huge significance for semiconductor photocatalysis. Herein, we report the fabrication of a series of 3D hierarchical bismuth oxyiodides via in situ phase transformation and phase-junction construction utilizing BiOI microspheres as self-sacrificed template through a facile calcination strategy. The multiform bismuth oxyiodides obtained at different temperatures include hierarchical BiOI, Bi4O5I2, Bi4O5I2-Bi5O7I phase junction and Bi5O7I. These bismuth oxyiodides exhibit very distinct microstructure and band structure, and their photoabsorption was orderly tuned from 700 to 400 nm, rendering the adjustable oxidation and reduction ability of band energy levels. The photocatalytic activity of the bismuth oxyiodide series is systematically assessed by degradation of diverse antibiotic and contaminants, such as tetracycline hydrochloride, bisphenol A (BPA) and azo dye Rhodamine B (RhB). It disclosed that they present discrepant photocatalytic performance with activity order of Bi4O5I2-Bi5O7I>Bi4O5I2 > Bi5O7I > BiOI, which is closely associated with the charge separation efficiency, band structure and surface area. Additionally, the photocatalytic mechanism and degradation pathway are also surveyed. The study may furnish new insights into development of novel 3D hierarchical architectures and nano-phase-junctions for heterogeneous photocatalysis. (C) 2016 Elsevier B.V. All rights reserved.

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第 203 条，共 321 条

标题: FRACTAL CHARACTERIZATION OF DYNAMIC FRACTURE NETWORK EXTENSION IN POROUS MEDIA

作者: Cai, JC (Cai, Jianchao); Wei, W (Wei, Wei); Hu, XY (Hu, Xiangyun); Liu, RC (Liu, Richeng); Wang, JJ (Wang, Jinjie)

来源出版物: FRACTALS-COMPLEX GEOMETRY PATTERNS AND SCALING IN NATURE AND SOCIETY 卷: 25 期: 2 文献号: 1750023 DOI: 10.1142/S0218348X17500232 出版年: APR 2017

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摘要: Fracture network and fractured porous media as well as their transport properties have received great attentions in many fields from engineering application and basic theoretical researches. Fracture will dynamically extend in length and aperture to form complex fracture network under some external conditions such as percussion drilling, wave propagation, desiccation and hydrofracturing. The complexity of fracture network can be well quantitatively characterized by fractal dimension. In this work, the dynamic characterization of fracture network extension in porous media under drying process is measured by the improved box-counting technique, and fractal dimensions of fracture network are respectively related to drying time, average aperture, moisture content and fracture porosity. The fractal dimension increases exponentially with drying time and average aperture, and decreases with moisture content in the form of power law. Specially, the fractal dimension is approximatively increased with porosity in the form of linearity in a narrow porosity range. The transport capacity of fracture network, described by seepage coefficient, is also related to the fractal dimension with drying time in the form of exponential function. The presented fractal analysis of fracture network could also shed light on the hydrofracturing application in subsurface unconventional oil and gas reservoirs.

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第 204 条，共 321 条

标题: A survey of swarm intelligence for dynamic optimization: Algorithms and applications

作者: Mavrovouniotis, M (Mavrovouniotis, Michalis); Li, CH (Li, Changhe); Yang, SX (Yang, Shengxiang)

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摘要: Swarm intelligence (SI) algorithms, including ant colony optimization, particle swarm optimization, bee inspired algorithms, bacterial foraging optimization, firefly algorithms, fish swarm optimization and many more, have been. proven to be good methods to address difficult optimization problems under stationary environments. Most SI algorithms have been developed to address stationary optimization problems and hence, they can converge on the (near-) optimum solution efficiently. However, many real-world problems have a dynamic environment that changes over time. For such dynamic optimization problems (DOPs), it is difficult for a conventional SI algorithm to track the changing optimum once the algorithm has converged on a solution. In the last two decades, there has been a growing interest of addressing DOPs using SI algorithms due to their adaptation capabilities. This paper presents a broad review on Si dynamic optimization (SIDO) focused on several classes of problems, such as discrete, continuous, constrained, multi-objective and classification problems, and real-world applications. In addition, this paper focuses on the enhancement strategies integrated in SI algorithms to address dynamic changes, the performance measurements and benchmark generators used in SIDO. Finally, some considerations about future directions in the subject are given.

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第 205 条，共 321 条

标题: Characteristics of pore structure and fractal dimension of low-rank coal: A case study of Lower Jurassic Xishanyao coal in the southern Junggar Basin, NW China

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摘要: In this study, a series of laboratory experiments were performed to firstly analyze the characteristics of the pore structure in low-rank coal (R-o < 0.70%), and then relationships between fractal dimensions and coal rank, coal composition and pore structure, and their impacts on methane adsorbability and seepage ability were studied too. The desorption isotherms of low-rank coal mainly belongs to Type B, which are primarily caused by ink-bottle-shaped and narrow-slit pores that are good for coalbed methane (CBM) enrichment, but bad for seepage. The seepage pores are dominated by primary plant macropores (>1000 nm), with a poor development of mesopores (100-1000 nm). The fractal features of adsorbed pores and seepage pores were defined and calculated using fractal dimensions D-2 (2.563-2.926) and D-4 (2.683-3.263), respectively. D-2 has a positive correlation with moisture content, while D-4 has a positive correlation with Ro and fixed carbon and a negative correlation with the volatile content. Both D-2 and D-4 have a weaker association with the ash yield and no apparent relationship with coal macerals, indicating that coal-forming materials and environments have little influence on the pore structure fractal characteristics. D-2 has a strongly correlation with the BET surface area (R-2 = 0.9026) and the average pore diameter (R-2 = 0.9841), again proving that D-2 can be used to characterize the pore structure fractal dimension of adsorbed pores. D-2 shows a negative correlation with the Langmuir volume (VI), but no apparent relationship with the Langmuir pressure (P-L), indicating that the pore structure of absorbed pores has little effect on methane desorption during the process of CBM exploitation. D-4 has weak positive correlation with permeability. Overall, fractal analysis is beneficial for better understanding the pore structure, methane adsorbability and seepage ability of low-rank coal. (C) 2016 Elsevier Ltd. All rights reserved.

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第 206 条，共 321 条

标题: Multi-step ahead electricity price forecasting using a hybrid model based on two-layer decomposition technique and BP neural network optimized by firefly algorithm

作者: Wang, DY (Wang, Deyun); Luo, HY (Luo, Hongyuan); Grunder, O (Grunder, Olivier); Lin, YB (Lin, Yanbing); Guo, HX (Guo, Haixiang)

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摘要: In the deregulated competitive electricity market, the price which reflects the relationship between electricity supply and demand is one of the most important elements, making it crticial for all market participants to precisely forecast the electricity price. However, electricity price series usually has complex features such as non-linearity, non-stationarity and volatility, which makes the price forecasting turn out to be very difficult. In order to improve the accuracy of electricity price forecasting, this paper first proposes a two-layer decomposition technique and then develops a hybrid model based on fast ensemble empirical mode decomposition (FEEMD), variational mode decomposition (VMD) and back propagation (BP) neural network optimized by firefly algorithm (FA). The proposed model is unique in the sense that VMD is specifically applied to further decompose the high frequency intrinsic mode functions (IMFs) generated by FEEMD into a number of modes in order to improve the forecast accuracy. To validate the effectiveness and accuracy of the proposed model, three electricity price series respectively collected from the real-world electricity markets of Australia and France are adopted to conduct the empirical study. The results indicate that the proposed model outperforms the other considered models over horizons of one-step, two-step, four-step and six-step ahead forecasting, which shows that the proposed model has superior performances for both one-step and multi-step ahead forecasting of electricity price. (C) 2016 Elsevier Ltd. All rights reserved.

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第 207 条，共 321 条

标题: Fe-based catalysts for heterogeneous catalytic ozonation of emerging contaminants in water and wastewater

作者: Wang, JL (Wang, Jianlong); Bai, ZY (Bai, Zhiyong)

来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 312 页: 79-98 DOI: 10.1016/j.cej.2016.11.118 出版年: MAR 15 2017

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摘要: Catalytic ozonation utilizes catalysts to improve the decomposition of ozone and the formation of hydroxyl radicals, which can overcome some disadvantages of ozonation. Fe-based materials are widely used as catalysts for heterogeneous catalytic ozonation due to their easy preparation, excellent catalytic performance and the abundance of Fe in nature. In this paper, the performances of Various Fe-based catalysts, including Fe-0-derived, FeOOH-derived, Fe2O3-derived, Fe3O4-derived and iron oxides composite, their preparation and characterization methods were briefly introduced. The catalytic ozonation using Fe based catalysts for the degradation of various emerging contaminants, such as pesticides and herbicides, pharmaceuticals, phthalic acid esters, dyes, nitrobenzenes, phenols, as well as for the treatment of actual wastewater was summarized. The main influencing factors on catalytic ozonation of toxic organic pollutants were discussed, and their potential applications and perspectives were proposed. (C) 2016 Elsevier B.V. All rights reserved.

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第 208 条，共 321 条

标题: LED revolution: fundamentals and prospects for UV disinfection applications

作者: Chen, J (Chen, Jian); Loeb, S (Loeb, Stephanie); Kim, JH (Kim, Jae-Hong)

来源出版物: ENVIRONMENTAL SCIENCE-WATER RESEARCH & TECHNOLOGY 卷: 3 期: 2 页: 188-202 DOI: 10.1039/c6ew00241b 出版年: MAR 1 2017

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摘要: The UV-light emitting diode (LED) has been attracting significant attention as a new UV source that can replace conventional mercury gas-filled lamps in water disinfection applications. However, the UV-LED remains a relatively new addition to the water treatment toolbox. The current lack of fundamental understanding risks underutilizing uniquely advantageous features of the UV-LED due to unguided design and non-optimized disinfection practices. Our review presents the necessary fundamental knowledge required for the successful implementation of UV-LEDs, including the mechanism of light generation, LED chip fabrication, package design, and essential properties of UV-LEDs. We introduce distinct advantages, such as wavelength tuning, control of radiation patterns, and array design, while emphasizing the significant differences between LED and mercury lamp technologies required to achieve successful technology transfer. Previous studies investigated the design of UV-LED disinfection systems; however, little consensus has yet emerged regarding the integration of LEDs into flow-through reactors. While UV-LED disinfection systems will undisputedly mature in the near future, environmental engineers face a number of urgent research needs in this area including heat sink design, radiation pattern and array design optimization for uniform UV dose delivery, targeted pathogen-wavelength considerations, improved light extraction, and component monitoring systems.

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第 209 条，共 321 条

标题: Black-carbon absorption enhancement in the atmosphere determined by particle mixing state

作者: Liu, DT (Liu, Dantong); Whitehead, J (Whitehead, James); Alfarra, MR (Alfarra, M. Rami); Reyes-Villegas, E (Reyes-Villegas, Ernesto); Spracklen, DV (Spracklen, Dominick V.); Reddington, CL (Reddington, Carly L.); Kong, SF (Kong, Shaofei); Williams, PI (Williams, Paul I.); Ting, YC (Ting, Yu-Chieh); Haslett, S (Haslett, Sophie); Taylor, JW (Taylor, Jonathan W.); Flynn, MJ (Flynn, Michael J.); Morgan, WT (Morgan, William T.); McFiggans, G (McFiggans, Gordon); Coe, H (Coe, Hugh); Allan, JD (Allan, James D.)

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摘要: Atmospheric black carbon makes an important but poorly quantified contribution to the warming of the global atmosphere. Laboratory and modelling studies have shown that the addition of non-black-carbon materials to black-carbon particles may enhance the particles' light absorption by 50 to 60% by refracting and reflecting light. Real-world experimental evidence for this 'lensing' effect is scant and conflicting, showing that absorption enhancements can be less than 5% or as large as 140%. Here we present simultaneous quantifications of the composition and optical properties of individual atmospheric black-carbon particles. We show that particles with a mass ratio of non-black carbon to black carbon of less than 1.5, which is typical of fresh traffic sources, are best represented as having no absorption enhancement. In contrast, black-carbon particles with a ratio greater than 3, which is typical of biomass-burning emissions, are best described assuming optical lensing leading to an absorption enhancement. We introduce a generalized hybrid model approach for estimating scattering and absorption enhancements based on laboratory and atmospheric observations. We conclude that the occurrence of the absorption enhancement of black-carbon particles is determined by the particles' mass ratio of non-black carbon to black carbon.

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标题: The assembly of Rodinia: The correlation of early Neoproterozoic (ca. 900 Ma) high-grade metamorphism and continental arc formation in the southern Beishan Orogen, southern Central Asian Orogenic Belt (CAOB)

作者: Zong, KQ (Zong, Keqing); Klemd, R (Klemd, Reiner); Yuan, Y (Yuan, Yu); He, ZY (He, Zhenyu); Guo, JL (Guo, Jingliang); Shi, XL (Shi, Xiaoli); Liu, YS (Liu, Yongsheng); Hu, ZC (Hu, Zhaochu); Zhang, ZM (Zhang, Zeming)

来源出版物: PRECAMBRIAN RESEARCH 卷: 290 页: 32-48 DOI: 10.1016/j.precamres.2016.12.010 出版年: MAR 2017

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摘要: An early extensive Neoproterozoic (ca. 900 Ma) continental magmatic arc system covering hundreds of kilometers has been reported to occur in the South Beishan Orogenic Belt (SBOB) and the Central Tianshan (CTA) in the southern Central Asian Orogenic Belt (CAOB). However, evidence for coeval high-grade metamorphism and thus the formation of an accretionary orogen in the framework of Rodinia is ambiguous or absent. This study provides new petrological, geochemical and geochronological data for garnet-bearing schists (quartz + garnet + biotite + plagioclase +/- muscovite) from the SBOB in order to constrain its Neoproterozoic metamorphic history. The metamorphic zircon rims are either unzoned or display sector zoning in CL-images and reveal REE patterns with flat HREE patterns and negative Eu anomalies, which are interpreted to be in chemical equilibrium with garnet and plagioclase. The zircon U-Pb dating yields concordant U-Pb ages of 900 +/- 3 Ma, 897 +/- 2 Ma and 898 +/- 4 Ma for the metamorphic zircon rims. The inherited detrital zircon cores of one sample display a concordant U-Pb age of 1397 +/- 5 Ma that is consistent with the timing of formation for the extensive Mesoproterozoic continental arc in the SBOB and CTA. Based on phase equilibrium geothermobarometry and average P-T thermobarometric calculations, minimum amphibolite-facies P-T conditions are estimated to be >600 degrees C at pressure >0.6 GPa, which is thought to have been overprinted by subsequent Paleozoic metamorphism. However, the Ti-in-zircon thermometer still reveals temperatures of up to 840 C using the composition of metamorphic zircon rims, suggesting former ca. 900 Ma granulite-facies peak metamorphic temperatures. The combined petrological and geochronological evidence in conjunction with the continental affinity of the regional metamorphic rocks suggests that the SBOB and the eastern CTA experienced an early Neoproterozoic accretionary orogenesis during the final assembly stage of Rodinia. (C) 2017 Elsevier B.V. All rights reserved.

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第 211 条，共 321 条

标题: Detecting Hidden Chaotic Regions and Complex Dynamics in the Self-Exciting Homopolar Disc Dynamo

作者: Wei, ZC (Wei, Zhouchao); Moroz, I (Moroz, Irene); Sprott, JC (Sprott, Julien Clinton); Wang, Z (Wang, Zhen); Zhang, W (Zhang, Wei)

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摘要: In 1979, Moffatt pointed out that the conventional treatment of the simplest self-exciting homopolar disc dynamo has inconsistencies because of the neglect of induced azimuthal eddy currents, which can be resolved by introducing a segmented disc dynamo. Here we return to the simple dynamo system proposed by Moffatt, and demonstrate previously unknown hidden chaotic attractors. Then we study multistability and coexistence of three types of attractors in the autonomous dynamo system in three dimensions: equilibrium points, limit cycles and hidden chaotic attractors. In addition, the existence of two homoclinic orbits is proved rigorously by the generalized Melnikov method. Finally, by using Poincare compactification of polynomial vector fields in three dimensions, the dynamics near infinity of singularities is obtained.

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第 212 条，共 321 条

标题: Delay-dependent stability analysis of neural networks with time-varying delay: A generalized free-weighting-matrix approach

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, Lin); Lin, WJ (Lin, Wen-Juan); Wu, M (Wu, Min)

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摘要: This paper investigates the delay-dependent stability problem of continuous neural networks with a bounded time-varying delay via Lyapunov-Krasovskii functional (LKF) method. This paper focuses on reducing the conservatism of stability criteria by estimating the derivative of the LKF more accurately. Firstly, based on several zero-value equalities, a generalized free-weighting-matrix (GFWM) approach is developed for estimating the single integral term. It is also theoretically proved that the GFWM approach is less conservative than the existing methods commonly used for the same task. Then, the GFWM approach is applied to investigate the stability of delayed neural networks, and several stability criteria are derived. Finally, three numerical examples are given to verify the advantages of the proposed criteria. (C) 2016 Elsevier Inc. All rights reserved.

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第 213 条，共 321 条

标题: Noble metal-metal oxide nanohybrids with tailored nanostructures for efficient solar energy conversion, photocatalysis and environmental remediation

作者: Liu, XQ (Liu, Xueqin); Iocozzia, J (Iocozzia, James); Wang, Y (Wang, Yang); Cui, X (Cui, Xun); Chen, YH (Chen, Yihuang); Zhao, SQ (Zhao, Shiqiang); Li, Z (Li, Zhen); Lin, ZQ (Lin, Zhiqun)

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摘要: The controlled synthesis of nanohybrids composed of noble metals (Au, Ag, Pt and Pd, as well as AuAg alloy) and metal oxides (ZnO, TiO2, Cu2O and CeO2) have received considerable attention for applications in photocatalysis, solar cells, drug delivery, surface enhanced Raman spectroscopy and many other important areas. The overall architecture of nanocomposites is one of the most important factors dictating the physical properties of nanohybrids. Noble metals can be coupled to metal oxides to yield diversified nanostructures, including noble metal decorated-metal oxide nanoparticles (NPs), nanoarrays, noblemetal/metal oxide core/shell, noble metal/metal oxide yolk/shell and Janus noble metal-metal oxide nanostructures. In this review, we focus on the significant advances in tailored nanostructures of noble metal-metal oxide nanohybrids. The improvement in performance in the representative solar energy conversion applications including photocatalytic degradation of organic pollutants, photocatalytic hydrogen generation, photocatalytic CO2 reduction, dye-sensitized solar cells (DSSCs) and perovskite solar cells (PSCs) are discussed. Finally, we conclude with a perspective on the future direction and prospects of these controllable nanohybrid materials.

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第 214 条，共 321 条

标题: Carbonized Cotton Fabric for High-Performance Wearable Strain Sensors

作者: Zhang, MC (Zhang, Mingchao); Wang, CY (Wang, Chunya); Wang, HM (Wang, Huimin); Jian, MQ (Jian, Muqiang); Hao, XY (Hao, Xiangyang); Zhang, YY (Zhang, Yingying)

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摘要: Recent years have witnessed the booming development of flexible strain sensors. To date, it is still a great challenge to fabricate strain sensors with both large workable strain range and high sensitivity. Cotton is an abundant supplied natural material composed of cellulose fibers and has been widely used for textiles and clothing. In this work, the fabrication of highly sensitive wearable strain sensors based on commercial plain weave cotton fabric, which is the most popular fabric for clothes, is demonstrated through a low-cost and scalable process. The strain sensors based on carbonized cotton fabric exhibit fascinating performance, including large workable strain range (> 140%), superior sensitivity (gauge factor of 25 in strain of 0%-80% and that of 64 in strain of 80%-140%), inconspicuous drift, and long-term stability, simultaneously offering advantages of low cost and simplicity in device fabrication and versatility in applications. Notably, the strain sensor can detect a subtle strain of as low as 0.02%. Based on its superior performance, its applications in monitoring both vigorous and subtle human motions are demonstrated, showing its tremendous potential for applications in wearable electronics and intelligent robots.

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第 215 条，共 321 条

标题: Raising the Gangdese Mountains in southern Tibet

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摘要: The surface uplift of mountain belts is in large part controlled by the effects of crustal thickening and mantle dynamic processes (e.g., lithospheric delamination or slab breakoff). Understanding the history and driving mechanism of uplift of the southern Tibetan Plateau requires accurate knowledge on crustal thickening over time. Here we determine spatial and temporal variations in crustal thickness using whole-rock La/Yb ratios of intermediate intrusive rocks from the Gangdese arc. Our results show that the crust was likely of normal thickness prior to approximately 70Ma (similar to 37km) but began to thicken locally at approximately 70-60Ma. The crust reached (58-50)10km at 55-45Ma extending over 400km along the strike of the arc. This thickening was likely due to magmatic underplating as a consequence of rollback and then breakoff of the subducting Neo-Tethyan slab. The crust attained a thickness of 6812km at approximately 20-10Ma, as a consequence of underthrusting of India and associated thrust faulting. The Gangdese Mountains in southern Tibet broadly attained an elevation of >4000m at approximately 55-45Ma as a result of isostatic surface uplift driven by crustal thickening and slab breakoff and reached their present-day elevation by 20-10Ma. Our paleoelevation estimates are consistent not only with the C-O isotope-based paleoaltimetry but also with the carbonate-clumped isotope paleothermometer, exemplifying the promise of reconstructing paleoelevation in time and space for ancient orogens through a combination of magmatic composition and Airy isostatic compensation.

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第 216 条，共 321 条

标题: Deep carbon cycles constrained by a large-scale mantle Mg isotope anomaly in eastern China

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摘要: Although deep carbon recycling plays an important role in the atmospheric CO2 budget and climate changes through geological time, the precise mechanisms remain poorly understood. Since recycled sedimentary carbonate through plate subduction is the main light-delta Mg-26 reservoir within deep-Earth, Mg isotope variation in mantle-derived melts provides a novel perspective when investigating deep carbon cycling. Here, we show that the Late Cretaceous and Cenozoic continental basalts from 13 regions covering the whole of eastern China have low delta Mg-26 isotopic compositions, while the Early Cretaceous basalts from the same area and the island arc basalts from circum-Pacific subduction zones have mantle-like or heavy Mg isotopic characteristics. Thus, a large-scalemantle low delta Mg-26 anomaly in eastern China has been delineated, suggesting the contribution of sedimentary carbonates recycled into the upper mantle, but limited into the lower mantle. This large-scale spatial and temporal variation ofMg isotopes in the mantle places severe constraints on deep carbon recycling via oceanic subduction.

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第 217 条，共 321 条

标题: A holistic low carbon city indicator framework for sustainable development

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摘要: Many cities are pursuing the low-carbon practices to reduce CO2 and other environmental emissions. However, it is still unclear which aspects a low-carbon city (LCC) covers and how to quantify and certify its low carbon level. In this paper, an indicator framework for the evaluation of LCC was established from the perspectives of Economic, Energy pattern, Social and Living, Carbon and Environment, Urban mobility, Solid waste, and Water. A comprehensive evaluation method was employed for LCC ranking by using the entropy weighting factor method. The benchmark values for LCC certification were also identified. The framework was applied to 10 global cities to rank their low-carbon levels. The comparison of cities at different levels of economic, social, and environmental development enhances the holistic of the study. The results showed that Stockholm, Vancouver, and Sydney ranked higher than the benchmark value, indicating these cities achieved a high level of low-carbon development. Sao Paulo, London, and Mexico City are still in the slow transition towards LCC. Beijing and New York each has much lower LCC level than the benchmark value due to the poor environmental performance and infrastructure supports caused by intensive human activities. The proposed indicator system serves as a guideline for the standardization of LCC and further identifies the key aspects of low-carbon management for different cities. (C) 2016 Elsevier Ltd. All rights reserved.

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第 218 条，共 321 条

标题: Cost Efficient Resource Management in Fog Computing Supported Medical Cyber-Physical System

作者: Gu, L (Gu, Lin); Zeng, DZ (Zeng, Deze); Guo, S (Guo, Song); Barnawi, A (Barnawi, Ahmed); Xiang, Y (Xiang, Yong)

来源出版物: IEEE TRANSACTIONS ON EMERGING TOPICS IN COMPUTING 卷: 5 期: 1 页: 108-119 DOI: 10.1109/TETC.2015.2508382 出版年: JAN-MAR 2017

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摘要: With the recent development in information and communication technology, more and more smart devices penetrate into people's daily life to promote the life quality. As a growing healthcare trend, medical cyber-physical systems (MCPSs) enable seamless and intelligent interaction between the computational elements and the medical devices. To support MCPSs, cloud resources are usually explored to process the sensing data from medical devices. However, the high quality-of-service of MCPS challenges the unstable and long-delay links between cloud data center and medical devices. To combat this issue, mobile edge cloud computing, or fog computing, which pushes the computation resources onto the network edge (e.g., cellular base stations), emerges as a promising solution. We are thus motivated to integrate fog computation and MCPS to build fog computing supported MCPS (FC-MCPS). In particular, we jointly investigate base station association, task distribution, and virtual machine placement toward cost-efficient FC-MCPS. We first formulate the problem into a mixed-integer non-linear linear program and then linearize it into a mixed integer linear programming (LP). To address the computation complexity, we further propose an LP-based two-phase heuristic algorithm. Extensive experiment results validate the high-cost efficiency of our algorithm by the fact that it produces near optimal solution and significantly outperforms a greedy algorithm.

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第 219 条，共 321 条

标题: In situ assembly of BiOI@Bi12O17Cl2 p-n junction: charge induced unique front-lateral surfaces coupling heterostructure with high exposure of BiOI {001} active facets for robust and nonselective photocatalysis

作者: Huang, HW (Huang, Hongwei); Xiao, K (Xiao, Ke); He, Y (He, Ying); Zhang, TR (Zhang, Tierui); Dong, F (Dong, Fan); Du, X (Du, Xin); Zhang, YH (Zhang, Yihe)

来源出版物: APPLIED CATALYSIS B-ENVIRONMENTAL 卷: 199 页: 75-86 DOI: 10.1016/j.apcatb.2016.06.020 出版年: DEC 15 2016

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摘要: Synthesis of reactive exposing facets and p-n junction are of great importance for semiconductor photo catalysis. Herein, we develop a p-n junction BiOI@Bi12O17Cl2 heterostructure via facilely in situ depositing BiOI nanosheets on the surface of Bi12O17Cl2 plates. Owing to the charge inducement, the BiOI nanosheets are all vertically assembled onto the Bi12O17Cl2 large plates to form a unique front-lateral surfaces coupling heterostructure, which enables high exposure of {001} reactive exposing facets of BiOI. The photocatalytic properties are systematically evaluated by degrading multiform industrial contaminants and antibiotic, like 2,4-dichlorophenol (2,4-DCP), rhodamine B (RhB), phenol, bisphenol A (BPA), and tetracycline hydrochloride. It reveals that the BiOI@Bi12O17Cl2 heterostructure not only shows dramatically strengthened photocatalytic activity, but also unfold powerful and nonselective photooxidation ability under visible-light illumination. The photoelectrochemical characterizations demonstrated that the drastically promoted separation and transfer of charge carriers that derived from the benefits of BiOI {001} active facets and BiOI@Bi12O17Cl2 p-n junction are in charge of the high photo-activity. Detailed radicals detection and quantification experiments further corroborate our conclusions. The study may give us some new hints on designing novel heterostructured photoelectronic materials with integrating p-n junction and active exposing facets. (C) 2016 Elsevier B.V. All rights reserved.

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第 220 条，共 321 条

标题: Efficient activation of peroxymonosulfate by magnetic Mn-MGO for degradation of bisphenol A

作者: Du, JK (Du, Jiangkun); Bao, JG (Bao, Jianguo); Liu, Y (Liu, Ying); Ling, HB (Ling, Haibo); Zheng, H (Zheng, Han); Kim, SH (Kim, Sang Hoon); Dionysiou, DD (Dionysiou, Dionysios D.)

来源出版物: JOURNAL OF HAZARDOUS MATERIALS 卷: 320 页: 150-159 DOI: 10.1016/j.jhazmat.2016.08.021 出版年: DEC 15 2016

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摘要: A heterogeneous manganese/magnetite/graphene oxide (Mn-MGO) hybrid catalyst was fabricated through the reduction of KMnO4 by ethylene glycol in the presence of magnetite/GO (MGO) particles. The Mn-MGO catalyst exhibited high efficacy and long-term stability in activating peroxymonosulfate (PMS) to generate sulfate radicals for the removal of bisphenol A (BPA) from water. The results of the batch experiments indicated that an increase in the catalyst dose and solution pH could enhance BPA degradation in the coupled Mn-MGO/PMS system. Regardless of the initial pH, the solution pH significantly dropped after the reaction, which was caused by catalytic PMS activation. The production of sulfate radicals and hydroxyl radicals was validated through radical quenching and electron paramagnetic resonances (EPR) tests. BPA degradation pathways were proposed on the basis of LC-MS and GC-MS analyses. Finally, a possible mechanism of catalytic PMS activation was proposed that involved electron transfer from MnO or Mn2O3 to PMS with the generation of sulfate radicals, protons and MnO2, as well as the simultaneous reduction of MnO2 by PMS. (C) 2016 Elsevier B.V. All rights reserved.

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第 221 条，共 321 条

标题: Joint Optimization of Task Scheduling and Image Placement in Fog Computing Supported Software-Defined Embedded System

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摘要: Traditional standalone embedded system is limited in their functionality, flexibility, and scalability. Fog computing platform, characterized by pushing the cloud services to the network edge, is a promising solution to support and strengthen traditional embedded system. Resource management is always a critical issue to the system performance. In this paper, we consider a fog computing supported software-defined embedded system, where task images lay in the storage server while computations can be conducted on either embedded device or a computation server. It is significant to design an efficient task scheduling and resource management strategy with minimized task completion time for promoting the user experience. To this end, three issues are investigated in this paper: 1) how to balance the workload on a client device and computation servers, i.e., task scheduling, 2) how to place task images on storage servers, i.e., resource management, and 3) how to balance the I/O interrupt requests among the storage servers. They are jointly considered and formulated as a mixed-integer nonlinear programming problem. To deal with its high computation complexity, a computation-efficient solution is proposed based on our formulation and validated by extensive simulation based studies.

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第 222 条，共 321 条

标题: Microplastic pollution of lakeshore sediments from remote lakes in Tibet plateau, China

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来源出版物: ENVIRONMENTAL POLLUTION 卷: 219 页: 450-455 DOI: 10.1016/j.envpol.2016.05.048 出版年: DEC 2016

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摘要: Tibetan Plateau is known as the world's third pole, which is characterized by a low population density with very limited human activities. Tibetan Plateau possesses the greatest numbers of high-altitude inland lakes in the world. However, no information is currently available on the characteristic of microplastic pollution in those lakes within this remote area. In this work, lakeshore sediments from four lakes within the Siling Co basin in northern Tibet were sampled and examined for microplastics (<5 mm). Microplastics were detected in six out of seven sampling sites with abundances ranging from 8 +/- 14 to 563 +/- 1219 items/m(2). Riverine input might have contributed to the high abundance of microplastics observed in this remote area. Morphological features suggest that microplastics are derived from the breakdown of daily used plastic products. Polyethylene, polypropylene, polystyrene, polyethylene terephthalate, and polyvinyl chloride were identified from the microplastic samples using laser Raman spectroscopy, and oxidative and mechanical weathering textures were observed on the surface of microplastics using scanning electron microscope. These results demonstrate the presence of micro plastics even for inland lakes in remote areas under very low human impact, and microplastic pollution can be a global issue. (C) 2016 Elsevier Ltd. All rights reserved.

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第 223 条，共 321 条

标题: Insights into the tectonic evolution of the North China Craton through comparative tectonic analysis: A record of outward growth of Precambrian continents

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摘要: Archean cratons have map patterns and rock associations that are diagnostic of the Wilson Cycle. The North China Craton (NCC) consists of several distinctly different tectonic units, but the delineation and understanding of the significance of individual sutures and the rocks between them has been controversial. We present an actualistic tectonic division and evolution of the North China Craton based on Wilson Cycle and comparative tectonic analysis that uses a multi-disciplinary approach in order to define sutures, their ages, and the nature of the rocks between them, to determine their mode of formation and means of accretion or exhumation, and propose appropriate modern analogues. The eastern unit of the craton consists of several different small blocks assembled between 2.6 and 2.7 Ga ago, that resemble fragments of accreted arcs from an assembled archipelago similar to those in the extant SW Pacific. A thick Atlantic-type passive margin developed on the western side of the newly assembled Eastern Block by 2.6-2.5 Ga. A > 1300 km-long arc and accretionary prism collided with the margin of the Eastern Block at 2.5 Ga, obducting ophiolites and ophiolitic melanges onto the block, and depositing a thick clastic wedge in a foreland basin farther into the Eastern Block. This was followed by an arc-polarity reversal, which led to a short-lived injection of mantle wedge-derived melts to the base of the crust that led to the intrusion of mafic dikes and arc-type granitoid (TTG) plutons with associated metamorphism. By 2.43 Ga, the remaining open ocean west of the accreted arc closed with the collision of an oceanic plateau now preserved as the Western Block with the collision-modified margin of the Eastern Block, causing further deformation in the Central Orogenic Belt. 2.4-235 Ga rifting of the newly amalgamated continental block formed a rift along its center, and new oceans within the other two rift arms, which removed a still-unknown continental fragment from its northern margin. By 2.3 Ga an arc collided with a new Atlantic-type margin developed over the rift sequence along the northern margin of the craton, and thus was converted to an Andean margin through arc-polarity reversal.

Andean margin tectonics affected much of the continental block from 2.3 to 1.9 Ga, giving rise to a broad E-W swath of continental margin magmas, and retro-arc sedimentary basins including a foreland basin superimposed on the passive northern margin. The horizontal extent of these tectonic components is similar to that across the present-day Andes in South America. From 1.88 to 1.79 Ga a granulite facies metamorphic event was superimposed across the entire continental block with high-pressure granulites and eclogites in the north, and medium-pressure granulites across the whole craton to the south. The scale and duration of this post-collisional event is similar to that in Central Asia that resulted from the Cenozoic India-Asia collision. The deep crustal granulites and volcanic rocks on the surface today, interpreted to be anatectic melts from deep crustal granulites, are similar to high-grade metamorphic rocks and partial melts presently forming at mid-crustal levels beneath Tibet. Structural fabrics in lower-crustal migmatites related to this event reveal that they flowed laterally parallel to the collision boundary, in a way comparable to what is speculated to be happening in the deep crust of the Himalayan/Tribetan foreland. We relate this continent-continent collision to the collision of the North China Craton with the postulated Columbia (Nuna) Continent. The NCC broke out of the Columbia Continent between 17531673 Ma, as shown by the formation of a suite of anorthosite, mangerite, charnocicite, and alkali-feldspar granites in an ENE-striking belt along the northern margin of the craton, whose intrusion was followed by the development of rifts and graben, mafic dike swarms, and eventually an Atlantic-type passive margin that signaled the beginning of a long period of tectonic quiescence and carbonate deposition for the NCC during Sinian times, which persisted into the Paleozoic. The style of tectonic accretion in the NCC changed at circa 2.5 Ga, from an earlier phase of accretion of arcs that are presently preserved in horizontal lengths of several hundred kilometers, to the accretion and preservation of linear arcs several thousand kilometers long with associated oceanic plateaus, microcontinents, and accretionary prisms. The style of progressively younger and westward outward accretion of different tectonic components is reminiscent of the style of accretion in the Superior Craton, and may signal the formation of progressively larger landmasses at the end of the Archean (perhaps like the Kenorland Continent), then into the Paleoproterozoic, culminating in the assembly of the Columbia (Nuna) Continent at 1.9-1.8 Ga. (C) 2016 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY license.

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第 224 条，共 321 条

标题: A comparative evaluation of coal specific surface area by CO2 and N-2 adsorption and its influence on CH4 adsorption capacity at different pore sizes

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摘要: Coal has a heterogenous porosity that influences its specific surface area (SSA) and CH4 adsorption and desorption. However, the pore size distribution obtained with N-2 adsorption is only reliable at pore sizes >2 nm omitting the important contribution of micropore (<2 nm). Here, 13 coal samples from three series were measured by both the N-2 at 77 K and CO2 at 273 K, respectively, to compared the adsorption pore structure characteristics of different coal ranks, seams, and macrolithotypes, which further revealed the influences of mesopore (2-50 nm) and micropore on CH4 adsorption capacity at different pore sizes. The larger micropore total pore volume (TPV) contributes to the larger micropore SSA. As micropores are common and contribute extensively to most of the SSA (>99%) in these coals, a much better relationship exists between the Dubinin-Radushkevich (DR) SSA and CH4 adsorption capacity (Langmuir volume). With the increase of the coal rank, the CH4 adsorption capacity increases continuously and the DR SSA shows a tendency of first decreasing then increasing; at the same coal rank, from the bright to dull coal, the vitrinite content as well as the DR SSA and CH4 adsorption capacity decreases; for the three main coal seams in the Hancheng mine area, the No. 11 coal has the largest DR SSA and CH4 adsorption capacity followed by the No. 3 coal and No. 5 coal. With CO2 adsorption, it is more significant than N-2 adsorption to accurately characterize the microscopic structure of coal and understand the gas adsorption mechanism. (C) 2016 Elsevier Ltd. All rights reserved.

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标题: Fractal characterization of pore-fracture in low-rank coals using a low-field NMR relaxation method

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摘要: To describe a low-field nuclear magnetic resonance (NMR) method for quantifying pore-fracture fractal dimensions and their influence on effective porosity and permeability, we performed modeling comparisons between fractal analysis and pore-fracture physical properties in low-rank coals. The adsorption space fractal (D-NMRA), seepage space fractal (D-NMRS) and moveable fluid space fractal (D-NMRM) were calculated to be 1.62-1.91, 2.77-2.98 and 1.56-2.75, respectively. The D-NMRA generally increased with increasing Langmuir volume (V-L, 9.54-31.06 m(3)/t), Langmuir pressure (P-L, 0.58-8.13 MPa), the Brunauer-Emmett-Teller (BET) surface area and its fractal dimension. Higher D-NMRA indicated the significant coalbed methane (CBM) adsorption capability. Both the D-NMRS and D-NMRM decreased with increasing areas of T-2 > 2.5 ms distribution (S-T and S-CT) and sorting coefficient. These phenomena showed that the NMR fractal method could reflect the coal pore-fracture heterogeneity and had significant influence on seepage space content. The correlations of moveable fluid porosity and permeability with D-NMRM can be found by performing the models of y = ax + b (a < 0), so coals with high D-NMRM occur to have low flow capability. Furthermore, the pore-fracture porosity and permeability have positive correlations with ST and SCT, which result from the connection between pores and fractures. These results also show that fractal analysis calculated with T-2 can be developed to appraise the physical properties of low-rank coals and supply some reference for a relatively full identification of porous media. We advise that low-field NMR can be employed as a lossless analytic method to quantify moveable fluid space fractal theory. (C) 2016 Elsevier Ltd. All rights reserved.

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第 226 条，共 321 条

标题: Extracellular electron transfer mechanisms between microorganisms and minerals

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摘要: Electrons can be transferred from microorganisms to multivalent metal ions that are associated with minerals and vice versa. As the microbial cell envelope is neither physically permeable to minerals nor electrically conductive, microorganisms have evolved strategies to exchange electrons with extracellular minerals. In this Review, we discuss the molecular mechanisms that underlie the ability of microorganisms to exchange electrons, such as c-type cytochromes and microbial nanowires, with extracellular minerals and with microorganisms of the same or different species. Microorganisms that have extracellular electron transfer capability can be used for biotechnological applications, including bioremediation, biomining and the production of biofuels and nanomaterials.

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标题: Big Data Meet Green Challenges: Big Data Toward Green Applications

作者: Wu, JS (Wu, Jinsong); Guo, S (Guo, Song); Li, J (Li, Jie); Zeng, DZ (Zeng, Deze)

来源出版物: IEEE SYSTEMS JOURNAL 卷: 10 期: 3 页: 888-900 DOI: 10.1109/JSYST.2016.2550530 出版年: SEP 2016

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摘要: Big data are widely recognized as being one of the most powerful drivers to promote productivity, improve efficiency, and support innovation. It is highly expected to explore the power of big data and turn big data into big values. To answer the interesting question whether there are inherent correlations between the two tendencies of big data and green challenges, a recent study has investigated the issues on greening the whole life cycle of big data systems. This paper would like to discover the relations between the trend of big data era and that of the new generation green revolution through a comprehensive and panoramic literature survey in big data technologies toward various green objectives and a discussion on relevant challenges and future directions.

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第 228 条，共 321 条

标题: Gold mineralization in China: Metallogenic provinces, deposit types and tectonic framework

作者: Deng, J (Deng, Jun); Wang, QF (Wang, Qingfei)

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摘要: We present a review of major gold mineralization events in China and a summary of metallogenic provinces, deposit types, metallogenic epochs and tectonic settings. Over 200 investigated gold deposits are grouped into 16 Au-metallogenic provinces within five tectonic units such as the Central Asian orogenic belt comprising provinces of Northeast China and Tianshan-Altay; North China Craton comprising the northern margin, Jiaodong, and Xiaoqinling; the Qinling-Qilian-Kunlun orogenic belt consisting of the West Qingling, North Qilian, and East Kunlun; the Tibet and Sanjiang orogenic belts consisting of Lhasa, Garze-Litang, Ailaoshan, and Daduhe-Jinpingshan; and the South China block comprising Youjiang basin, Jiangnan orogenic belt, Middle and Lower Yangtze River, and SE coast. The gold deposits are classified as orogenic, Jiaodong-, porphyry-skarn, Carlin-like, and epithermal-types, among which the first three types are dominant.

The orogenic gold deposits formed in various tectonic settings related to oceanic subduction and subsequent crustal extension in the Qinling-Qilian-Kunlun, Tianshan-Altay, northern margin of North China Craton, and Xiaoqinling, and related to the Eocene-Miocene continental collision in the Tibet and Sanjiang orogenic belts. The tectonic periods such as from slab subduction to block amalgamation, from continental soft to hard collision, from intracontinental compression to shearing or extension, are important for the formation of the orogenic gold deposits. The orogenic gold deposits are the products of metamorphic fluids released during regional metamorphism associated with oceanic subduction or continental collision, or related to magma emplacement and associated hydrothermal activity during lithospheric extension after ocean closure. The Jiaodong-type, clustered around Jiaodong, Xiaoqinling, and the northern margin of the North China Craton, is characterized by the involvement of mantle-derived fluids and a temporal link to the remote subduction of the Pacific oceanic plate concomitant with the episodic destruction of North China Craton. The Carlin-like gold metallogenesis is related to the activity of connate fluid, metamorphic fluid, and meteoric water in different degrees in the Youjiang basin and West Qinling; the former Au province is temporally related to the remote subduction of the Tethyan oceanic plate and the later formed in a syn-collision setting. Porphyry-skarn Au deposits are distributed in the Tianshan-Altay, the Middle and Lower Yangtze River region, and Tibet and Sanjiang orogenic belts in both subduction and continental collision settings. The magma for the porphyry-skarn Au deposits commonly formed by melting of a thickened juvenile crust The epithermal Au deposits, dominated by the low-sulfidation type, plus a few high-sulfidation ones, were produced during the Carboniferous oceaic plate subduction in Tianshan-Altay, during Early Cretaceous and Quaternary oceanic plate subduction in SEt coast of South China Block, and during the Pliocene continental collision in Tibet. The available data of different isotopic systems, especially fluid D-O isotopes and carbonate C-O systems, reveal that the isotopic compositions are largely overlapping for different genetic types and different for the same genetic type in different Au belts. The isotopic compositions are thus not good indicators of various genetic types of gold deposit, perhaps due to overprinting of post-ore alteration or the complex evolution of the fluids.

Although gold metallogeny in China was initiated in Cambrian and lasted until Cenozoic, it is mainly concentrated in four main periods. The first is Carboniferous when the Central Asian orogenic belt formed by welding of micro continental blocks and arcs in Tianshan-Altay, generating a series of porphyry-epithermal-orogenic deposits. The second period is from Triassic to Early Jurassic when the current tectonic mainframe of China started to take shape. In central and southern China, the North China Craton, South China Block and Simao block were amalgamated after the closure of Paleo-Tethys Ocean in Triassic, forming orogenic and Carlin-like gold deposits. The third period is Early Cretaceous when the subduction of the Pacific oceanic plate to the east and that of Neo-Tethyan oceanic plate to the west were taking place. The subduction in eastern China produced the Jiaodong-type deposits in the North China Craton, the skarn-type deposits in the northern margin (Middle to lower reaches of Yangtze River) and the epithermal-type deposits in the southeastern margin in the South China Block. The subduction in western China produced the Carlin-like gold deposits in the Youjiang basin and orogenic ones in the Garze-Litang orogenic belt. The Cenozoic is the last major phase, during which southwestern China experienced continental collision, generating orogenic and porphyry-skarn gold deposits in the Tibetan and Sanjiang orogenic belts. Due to the spatial overlap of the second and third periods in a single gold province, the Xiaoqinling, West Qinling, and northern margin of the North China Craton have two or more episodes of gold metallogeny. (C) 2015 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Solar radiation prediction using different techniques: model evaluation and comparison

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摘要: Daily observations of meteorological parameters, air temperature, air pressure, relative humidity, water vapor pressure and sunshine duration hours observed at 12 stations in different climatic zones during 1961-2014 are reported for testing, validating and comparing different solar radiation models. Three types of Artificial Neural Network (ANN)methods, Multilayer Perceptron (MLP), Generalized Regression Neural Network (GRNN) and Radial Basis Neural Network (RBNN) are applied in this study for predicting the daily global solar radiation (Hg) using above meteorological variables as model inputs. The Bristow Campbell model has also been improved by considering the factors influencing the incoming solar radiation, such as relative humidity, cloud cover, etc. The results indicate that there are large differences in model accuracies for each model at different stations, the ANN models can estimate daily Hg with satisfactory accuracy at most stations in different climate zones, and MLP and RBNN models provide better accuracy than the GRNN and IBC models, for example, the MAE and RMSE values range 1.53-2.29 and 1.94-3.27 MJ m(-2) day(-1), respectively for MLP model. The model performances also show some differences at different stations for each model, for example, the RMSE values from MLP model are 1.94 and 3.27 MJ m(-2) day(-1) at NN and HZ stations, respectively. Meanwhile, ANN models underestimate few high radiation values at some stations, which may due to the differences in training and testing data ranges and distributions of the stations. Finally, the differences in model performances from different solar radiation models have been further analyzed. (C) 2016 Elsevier Ltd. All rights reserved.

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第 230 条，共 321 条

标题: Organolead Halide Perovskite Nanocrystals: Branched Capping Ligands Control Crystal Size and Stability

作者: Luo, BB (Luo, Binbin); Pu, YC (Pu, Ying-Chih); Lindley, SA (Lindley, Sarah A.); Yang, Y (Yang, Yi); Lu, LQ (Lu, Liqiang); Li, Y (Li, Yat); Li, XM (Li, Xueming); Zhang, JZ (Zhang, Jin Z.)

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摘要: CH3NH3PbBr3 perovskite nanocrystals (PNCs) of different sizes (ca. 2.5-100 nm) with high photoluminescence (PL) quantum yield (QY; ca. 15-55%) and product yield have been synthesized using the branched molecules, APTES and NH2-POSS, as capping ligands. These ligands are sterically hindered, resulting in a uniform size of PNCs. The different capping effects resulting from branched versus straight-chain capping ligands were compared and a possible mechanism proposed to explain the dissolution-precipitation process, which affects the growth and aggregation of PNCs, and thereby their overall stability. Unlike conventional PNCs capped with straight-chain ligands, APTES-capped PNCs show high stability in protic solvents as a result of the strong steric hindrance and propensity for hydrolysis of APTES, which prevent such molecules from reaching and reacting with the core of PNCs.

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标题: Thermal conductivity enhancement of polyethylene glycol/expanded vermiculite shape-stabilized composite phase change materials with silver nanowire for thermal energy storage

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摘要: A series of novel polyethylene glycol-silver nanowire/expanded vermiculite shape-stabilized composite phase change materials (PEG-Ag/EVM ss-CPCMs) were prepared by physical blending and impregnation method to overcome liquid leakage during phase transition and enhance the thermal conductivity of PEG. In these PEG-Ag/EVM ss-CPCMs, PEG served as the phase change material for thermal energy storage; Ag NW served as thermal conductivity enhancement filler; EVM acted as the supporting material to provide structural strength and prevent the leakage of melted PEG. SEM analysis results indicated that Ag NW wrapped with PEG was well dispersed and enwrapped inside the pores and surfaces of EVM due to capillary force and surface tension. It was found that the maximum encapsulation capacity of PEG in all PEG-Ag/EVM ss-CPCMs with good shape stability was 66.1 wt.%. The thermal conductivity of PEG-Ag/EVM ss-CPCMs could be greatly enhanced by the prepared Ag NW with a length of 5-20 mu m and a diameter of 50-100 nm. A theoretical calculation method was developed to predict and evaluate the thermal conductivity enhancement ability of Ag NW. The predictions were consistent with experimental results. The thermal conductivity of PEG-Ag/EVM ss-CPCM19.3 reached 0.68 W/m K, which was 11.3 times higher than that of pure PEG, and corresponding phase change latent heat was 96.4 J/g. The supercooling extent of PEG in PEG-Ag/EVM ss-CPCMs decreased approximate 7 degrees C because the EVM could act as a heterogeneous nucleation center to promote the crystallization of PEG. FT-IR and TGA results showed that the PEG-Ag/EVM ss-CPCMs exhibited excellent chemical compatibility and thermal stability. (C) 2016 Elsevier B.V. All rights reserved.

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第 232 条，共 321 条

标题: The Challenges and Solutions for Cadmium-contaminated Rice in China: A Critical Review

作者: Hu, YN (Hu, Yuanan); Cheng, HF (Cheng, Hefa); Tao, S (Tao, Shu)

来源出版物: ENVIRONMENT INTERNATIONAL 卷: 92-93 页: 515-532 DOI: 10.1016/j.envint.2016.04.042 出版年: JUL-AUG 2016

Web of Science 核心合集中的 "被引频次": 453

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摘要: The wide occurrence of Cd-contaminated rice in southern China poses significant public health risk and deserves immediate action, which arises primarily from extensive metal (including Cd) contamination of paddies with the fast expansion of nonferrous metal mining and smelting activities. Accumulation of Cd in rice grains can be reduced by removing Cd from the contaminated paddy soils, reducing its bioavailability, and controlling its uptake by rice plants. Although a range of measures can be taken to rehabilitate Cd-contaminated lands, including soil replacement and turnover, chemical washing, and phytoremediation, they are either too expensive and/or too slow. Various amendment materials, including lime, animal manures, and biochar, can be used to immobilize Cd in soils, but such fixation approach can only temporarily reduce Cd availability to rice uptake. Cultivation of alternative crops with low Cd accumulation in edible plant parts is impractical on large scales due to extensive contamination and food security concerns in southern China. Transgenic techniques can help develop rice cultivars with low Cd accumulation in grains, but little public acceptance is expected for such products. As an alternative, selection and development of low-Cd rice varieties and hybrids through plant biotechnology and breeding, particularly, by integration of marker-assisted selection (MAS) with traditional breeding, could be a practical and acceptable option that would allow continued rice production in soils with high bioavailability of Cd. Plant biotechnology and breeding can also help develop Cd-hyperaccumulating rice varieties, which can greatly facilitate phytoremediation of contaminated paddies. To eliminate the long-term risk of Cd entering the food chain, soils contaminated by Cd should be cleaned up when cost-effective remediation measures are available. (C) 2016 Elsevier Ltd. All rights reserved.

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第 233 条，共 321 条

标题: Stability Analysis for Delayed Neural Networks Considering Both Conservativeness and Complexity

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, Lin); Wu, M (Wu, Min)

来源出版物: IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS 卷: 27 期: 7 页: 1486-1501 DOI: 10.1109/TNNLS.2015.2449898 出版年: JUL 2016

Web of Science 核心合集中的 "被引频次": 187

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摘要: This paper investigates delay-dependent stability for continuous neural networks with a time-varying delay. This paper aims at deriving a new stability criterion, considering tradeoff between conservativeness and calculation complexity. A new Lyapunov-Krasovskii functional with simple augmented terms and delay-dependent terms is constructed, and its derivative is estimated by several techniques, including free-weighting matrix and inequality estimation methods. Then, the influence of the techniques used on the conservativeness and the complexity is analyzed one by one. Moreover, useful guidelines for improving criterion and future work are briefly discussed. Finally, the advantages of the proposed criterion compared with the existing ones are verified based on three numerical examples.

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第 234 条，共 321 条

标题: Stability analysis of systems with time-varying delay via relaxed integral inequalities

作者: Zhang, CK (Zhang, Chuan-Ke); He, Y (He, Yong); Jiang, L (Jiang, L.); Wu, M (Wu, Min); Zeng, HB (Zeng, Hong-Bing)

来源出版物: SYSTEMS & CONTROL LETTERS 卷: 92 页: 52-61 DOI: 10.1016/j.sysconle.2016.03.002 出版年: JUN 2016

Web of Science 核心合集中的 "被引频次": 249

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摘要: This paper investigates the stability of linear systems with a time-varying delay. The key problem concerned is how to effectively estimate single integral term with time-varying delay information appearing in the derivative of Lyapunov-Krasovskii functional. Two novel integral inequalities are developed in this paper for this estimation task. Compared with the frequently used inequalities based on the combination of Wirtinger-based inequality (or Auxiliary function-based inequality) and reciprocally convex lemma, the proposed ones can provide smaller bounding gap without requiring any extra slack matrix. Four stability criteria are established by applying those inequalities. Based on three numerical examples, the advantages of the proposed inequalities are illustrated through the comparison of maximal admissible delay bounds provided by different criteria. (C) 2016 Elsevier B.V. All rights reserved.

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第 235 条，共 321 条

标题: Deep feature weighting for naive Bayes and its application to text classification

作者: Jiang, LX (Jiang, Liangxiao); Li, CQ (Li, Chaoqun); Wang, SS (Wang, Shasha); Zhang, LG (Zhang, Lungan)

来源出版物: ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE 卷: 52 页: 26-39 DOI: 10.1016/j.engappai.2016.02.002 出版年: JUN 2016

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被引频次合计: 212

摘要: Naive Bayes (NB) continues to be one of the top 10 data mining algorithms due to its simplicity, efficiency and efficacy. Of numerous proposals to improve the accuracy of naive Bayes by weakening its feature independence assumption, the feature weighting approach has received less attention from researchers. Moreover, to our knowledge, all of the existing feature weighting approaches only incorporate the learned feature weights into the classification of formula of naive Bayes and do not incorporate the learned feature weights into its conditional probability estimates at all. In this paper, we propose a simple, efficient, and effective feature weighting approach, called deep feature weighting (DFW), which estimates the conditional probabilities of naive Bayes by deeply computing feature weighted frequencies from training data. Empirical studies on a collection of 36 benchmark datasets from the UCI repository show that naive Bayes with deep feature weighting rarely degrades the quality of the model compared to standard naive Bayes and, in many cases, improves it dramatically. Besides, we apply the proposed deep feature weighting to some state-of-the-art naive Bayes text classifiers and have achieved remarkable improvements. (C) 2016 Elsevier Ltd. All rights reserved.

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第 236 条，共 321 条

标题: Rapid oxygenation of Earth's atmosphere 2.33 billion years ago

作者: Luo, GM (Luo, Genming); Ono, SH (Ono, Shuhei); Beukes, NJ (Beukes, Nicolas J.); Wang, DT (Wang, David T.); Xie, SC (Xie, Shucheng); Summons, RE (Summons, Roger E.)

来源出版物: SCIENCE ADVANCES 卷: 2 期: 5 文献号: e1600134 DOI: 10.1126/sciadv.1600134 出版年: MAY 2016

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被引频次合计: 218

摘要: Molecular oxygen (O-2) is, and has been, a primary driver of biological evolution and shapes the contemporary landscape of Earth's biogeochemical cycles. Although "whiffs" of oxygen have been documented in the Archean atmosphere, substantial O-2 did not accumulate irreversibly until the Early Paleoproterozoic, during what has been termed the Great Oxygenation Event (GOE). The timing of the GOE and the rate at which this oxygenation took place have been poorly constrained until now. We report the transition (that is, from being mass-independent to becoming mass-dependent) in multiple sulfur isotope signals of diagenetic pyrite in a continuous sedimentary sequence in three coeval drill cores in the Transvaal Supergroup, South Africa. These data precisely constrain the GOE to 2.33 billion years ago. The new data suggest that the oxygenation occurred rapidly-within 1 to 10 million years-and was followed by a slower rise in the ocean sulfate inventory. Our data indicate that a climate perturbation predated the GOE, whereas the relationships among GOE, "Snowball Earth" glaciation, and biogeochemical cycling will require further stratigraphic correlation supported with precise chronologies and paleolatitude reconstructions.

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第 237 条，共 321 条

标题: A highly redox-heterogeneous ocean in South China during the early Cambrian (similar to 529-514 Ma): Implications for biota-environment co-evolution

作者: Jin, CS (Jin, Chengsheng); Li, C (Li, Chao); Algeo, TJ (Algeo, Thomas J.); Planaysky, NJ (Planaysky, Noah J.); Cui, H (Cui, Hao); Yang, XL (Yang, Xinglian); Zhao, YL (Zhao, Yuanlong); Zhang, XL (Zhang, Xingliang); Xie, SC (Xie, Shucheng)

来源出版物: EARTH AND PLANETARY SCIENCE LETTERS 卷: 441 页: 38-51 DOI: 10.1016/j.epsl.2016.02.019 出版年: MAY 1 2016

Web of Science 核心合集中的 "被引频次": 177

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摘要: The "Cambrian Explosion" is known for rapid increases in the morphological disparity and taxonomic diversity of metazoans. It has been widely proposed that this biological event was a consequence of oxygenation of the global ocean, but this hypothesis is still under debate. Here, we present high resolution Fe-S-C-Al-trace element geochemical records from the Jinsha (outer shelf) and Weng'an (outer shelf) sections of the early Cambrian Yangtze Platform, integrating these results with previously published data from six correlative sections representing a range of water depths (Xiaotan, Shatan, Dingtai, Yangjiaping, Songtao, and Longbizui). The integrated iron chemistry and redox-sensitive trace element data suggest that euxinic mid-depth waters dynamically coexisted with oxic surface waters and ferruginous deep waters during the earliest Cambrian, but that stepwise expansion of oxic waters commenced during Cambrian Stage 3 (similar to 521-514 Ma). Combined with data from lower Cambrian sections elsewhere, including Oman, Iran and Canada, we infer that the global ocean exhibited a high degree of redox heterogeneity during the early Cambrian, consistent with low atmospheric oxygen levels (similar to 10-40% of present atmospheric level, or PAL). A large spatial gradient in pyrite sulfur isotopic compositions (delta S-34(py)), which vary from a mean of -12.0 parts per thousand in nearshore areas to +22.5 parts per thousand in distal deepwater sections in lower Cambrian marine units of South China imply low concentrations and spatial heterogeneity of seawater sulfate, which is consistent with a limited oceanic sulfate reservoir globally. By comparing our reconstructed redox chemistry with fossil records from the lower Cambrian of South China, we infer that a stepwise oxygenation of shelf and slope environments occurred concurrently with a gradual increase in ecosystem complexity. However, deep waters remained anoxic and ferruginous even as macrozooplankton and suspension-feeding mesozooplankton appeared during Cambrian Stage 3. These findings suggest that the "Cambrian Explosion" in South China may have been primarily a consequence of locally improved oxygenation of the ocean-surface layer rather than of the full global ocean. Our observations are inconsistent with predicted changes in ocean chemistry driven by early Cambrian animals, suggesting that the influence of early Cambrian animals on contemporaneous ocean chemistry, as proposed in previous studies, may be overly exaggerated. (C) 2016 Elsevier B.V. All rights reserved.

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第 238 条，共 321 条

标题: The giant Jiaodong gold province: The key to a unified model for orogenic gold deposits?

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来源出版物: GEOSCIENCE FRONTIERS 卷: 7 期: 3 特刊: SI 页: 409-417 DOI: 10.1016/j.gsf.2015.08.002 出版年: MAY 2016

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摘要: Although the term orogenic gold deposit has been widely accepted for all gold-only lode-gold deposits, with the exception of Carlin-type deposits and rare intrusion-related gold systems, there has been continuing debate on their genesis. Early syngenetic models and hydrothermal models dominated by meteoric fluids are now clearly unacceptable. Magmatic-hydrothermal models fail to explain the genesis of orogenic gold deposits because of the lack of consistent spatially - associated granitic intrusions and inconsistent temporal relationships. The most plausible, and widely accepted, models involve metamorphic fluids, but the source of these fluids is hotly debated. Sources within deeper segments of the supracrustal successions hosting the deposits, the underlying continental crust, and subducted oceanic lithosphere and its overlying sediment wedge all have their proponents. The orogenic gold deposits of the giant Jiaodong gold province of China, in the delaminated North China Craton, contain ca. 120 Ma gold deposits in Precambrian crust that was metamorphosed over 2000 million years prior to gold mineralization. The only realistic source of fluid and gold is a subducted oceanic slab with its overlying sulfide-rich sedimentary package, or the associated mantle wedge. This could be viewed as an exception to a general metamorphic model where orogenic gold has been derived during greenschist- to amphibolite-facies metamorphism of supracrustal rocks: basaltic rocks in the Precambrian and sedimentary rocks in the Phanerozoic. Alternatively, if a holistic view is taken, Jiaodong can be considered the key orogenic gold province for a unified model in which gold is derived from late-orogenic metamorphic devolatilization of stalled subduction slabs and oceanic sediments throughout Earth history. The latter model satisfies all geological, geochronological, isotopic and geochemical constraints but the precise mechanisms of auriferous fluid release, like many other subduction-related processes, are model-driven and remain uncertain. (C) 2015, China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V.

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第 239 条，共 321 条

标题: Fractal/multifractal modeling of geochemical data: A review

作者: Zuo, RG (Zuo, Renguang); Wang, J (Wang, Jian)

来源出版物: JOURNAL OF GEOCHEMICAL EXPLORATION 卷: 164 特刊: SI 页: 33-41 DOI: 10.1016/j.gexplo.2015.04.010 出版年: MAY 2016

Web of Science 核心合集中的 "被引频次": 201

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摘要: Over the past several decades, a wide range of complex structures or phenomena of interest to geologists and geochemists has been quantitatively characterized using fractal/multifractal theory and models. With respect to the application of fractal/multifractal models to geochemical data, the focus has been on how to decompose geochemical populations or quantify the spatial distribution of geochemical data. A variety of fractal/multifractal models for this purpose have been proposed on the basis of the scaling characteristics of geochemical data. These include the concentration-area (C-A) fractal model, concentration-distance (C-D) fractal model, spectrum-area (S-A) multifractal model, multifractal singularity analysis, and the concentration-volume (C-V) fractal model. These fractal models have been widely demonstrated to be useful, as indicated by the increasing number of published papers. In this study, fractal/multifractal modeling of geochemical data including its theory, the way it works, its benefits and limitations, its applications, and the relationships between these models are reviewed. The comparison among of C-A, S-A, and multifractal singularity analysis based on simulated data suggested that mapping singularity technique can enhance and identify weak anomalies caused by buried sources. Future study should focus on how to distinguish the true anomalies associated to mineralization with the false anomalies from a fractal/multifractal perspective. (C) 2015 Elsevier B.V. All rights reserved.

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输出日期: 2023-09-04

第 240 条，共 321 条

标题: Application of time series analysis and PSO-SVM model in predicting the Bazimen landslide in the Three Gorges Reservoir, China

作者: Zhou, C (Zhou, Chao); Yin, KL (Yin, Kunlong); Cao, Y (Cao, Ying); Ahmed, B (Ahmed, Bayes)

来源出版物: ENGINEERING GEOLOGY 卷: 204 页: 108-120 DOI: 10.1016/j.enggeo.2016.02.009 出版年: APR 8 2016

Web of Science 核心合集中的 "被引频次": 202

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摘要: The landslide displacement in the Three Gorges Reservoir, China, experiences step-like deformation that is influenced by rainfall and the periodic scheduling of the reservoir. In view of the step-like characteristic, the Particle Swarm Optimization and Support Vector Machine (PSO-SVM) coupling model based on the response of the induced factors was proposed to predict the landslide displacement. The moving, average method was adopted to divide the total displacement into trend term and periodic term. The trend displacement was controlled by the geological conditions and predicted by polynomial function, while the periodic displacement was under the combined control of the triggers and the evolution state of the landslide. Therefore, the PSO-SVM model, based on the factors of the precipitation, the variation range of the reservoir and the displacements of the prior-periods, was proposed to predict the periodic displacement. The typical step-like landslide in the Three Gorges Reservoir, which is known as the Bazimen landslide, was taken as a case study to verify the prediction results. The values of the root mean square error and the mean absolute percentage error were 13.28 and 25.95, respectively. The results showed that rainfall and reservoir water level were the dominant factors for the step-like landslide deformation. The evolution state of the landslide was also significant in reflecting the response relationship between the displacement and inducing factors. In conclusion, the proposed PSO-SVM model can better represent the response relationship between the factors and the periodic displacement, which made the predicted values of the total displacement fit with the measured values greatly. (C) 2016 Elsevier B.V. All rights reserved.

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第 241 条，共 321 条

标题: Early Mesozoic southward subduction history of the Mongol-Okhotsk oceanic plate: Evidence from geochronology and geochemistry of Early Mesozoic intrusive rocks in the Erguna Massif, NE China

作者: Tang, J (Tang, Jie); Xu, WL (Xu, Wen-Liang); Wang, F (Wang, Feng); Zhao, S (Zhao, Shuo); Wang, W (Wang, Wei)

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摘要: In this paper we present new zircon U-Pb ages, Hf isotope data, and whole-rock major and trace element data for Early Mesozoic intrusive rocks in the Erguna Massif of NE China, and we use these data to constrain the history of southward subduction of the Mongol-Okhotsk oceanic plate, and its influence on NE China as a whole. The zircon U-Pb dating indicates that Early Mesozoic magmatic activity in the Erguna Massif can be subdivided into four stages at similar to 246 Ma, similar to 225 Ma, similar to 205 Ma, and similar to 185 Ma. The similar to 246 Ma intrusive rocks comprise a suite of high-K calc-alkaline diorites, quartz diorites, granodiorites, monzogranites, and syenogranites, with I-type affinities. The similar to 225 Ma intrusive rocks consist of gabbro-diorites and granitoids, and they constitute a bimodal igneous association. The similar to 205 Ma intrusive rocks are dominated by calc-alkaline I-type granitoids that are accompanied by subordinate intermediate-mafic rocks. The similar to 185 Ma intrusive rocks are dominated by I-type granitoids, accompanied by minor amounts of A-types. These Early Mesozoic granitoids mainly originated by partial melting of a depleted and heterogeneous lower crust, whereas the coeval mafic rocks were probably derived from partial melting of a depleted mantle modified by subduction-related fluids. The rock associations and their geochemical features indicate that the similar to 246 Ma, similar to 205 Ma, and similar to 185 Ma intrusive rocks formed in an active continental margin setting related to the southward subduction of the Mongol-Okhotsk oceanic plate. The similar to 225 Ma bimodal igneous rock association formed within an extensional environment in a pause during the subduction process of the Mongol -Okhotsk oceanic plate. Every magmatic stage has its own corresponding set of porphyry deposits in the southeast of the Mongol-Okhotsk suture belt Taking all this into account, we conclude the following: (1) during the Early Mesozoic, the Mongol-Okhotsk oceanic plate was subducted towards the south beneath the Erguna Massif, but with a pause in subduction at similar to 225 Ma; and (2) the southward subduction of the Mongol-Okhotsk oceanic plate not only caused the intense magmatic activity, but was also favorable to the formation of porphyry deposits. (C) 2015 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 242 条，共 321 条

标题: Pore structure characteristics of lower Silurian shales in the southern Sichuan Basin, China: Insights to pore development and gas storage mechanism

作者: Yang, F (Yang, Feng); Ning, ZF (Ning, Zhengfu); Wang, Q (Wang, Qing); Zhang, R (Zhang, Rui); Krooss, BM (Krooss, Bernhard M.)

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摘要: Silurian shale in Sichuan Basin is currently the most important target zone for shale gas exploration and development in China. Pore structure characteristics of Lower Silurian Longmaxi shales from southern Sichuan Basin were investigated. The combination of field emission scanning electron microscope (FE-SEM) and argon ion beam milling was utilized to describe the nanometer-to micrometer-scale (>1.2 nm) pore systems. The shales were characterized by organic geochemical and mineralogical analyses. Total porosity, pore size distribution (PSD), specific surface area, and gas content were determined. Controls of organic matter richness, thermal maturity, and mineralogy on porosity were examined. The contribution of individual mineral components to total porosity was analyzed quantitatively. Total gas contents of the shales determined from canister desorption data were compared with theoretical (sorptive and volumetric) gas storage capacities.

The total organic carbon (TOC) content of the shale samples ranges between 0.1 and 8.0 wt.% and helium porosity varies between 0.7 and 5.7%. Maturity in terms of equivalent vitrinite reflectance of bitumen (R-eqv) ranges from 1.8 to 3.2%. TOC content is a strong control for the pore system of these shales, and shows a positive correlation with porosity. Porosity increases with increasing thermal maturity when R-eqv is less than 2.5%, but decreases for higher thermal maturity samples. FE-SEM reveals four pore types related to the rock matrix that are classified as follows: organic matter (OM)-hosted pores, pores in clay minerals, pores of framework minerals, and intragranular pores in microfossils. Pores in clay minerals are always associated with the framework of clay flakes, and develop around rigid mineral grains because the pressure shadows of mineral grains prevent pores from collapsing. Pores of framework minerals are probably related to dissolution by acidic fluids, and the dissolution-related pores promote porosity of shales. A unimodal PSD exists in the micropore range of TOC-rich samples, while the PSD of carbonate-rich samples are bimodal. A PSD maximum in the micropore range is attributed by OM and another maximum in the range of mesopore-macropores is probably caused by the dissolution of carbonate minerals. Quantitative evaluation of the contribution of individual mineral components to porosity shows that the organic matter contributes approximately 62% to the total porosity. Framework minerals (quartz, feldspar, and carbonates, et al.) and clay minerals contribute 25% and 13%, respectively. The total gas content of these shales ranges from 0.4 to 62 m(3)/t, and the total gas contents of selected samples determined from canister desorption tests agree with the theoretically estimated original gas-in-place (OGIP). OM-hosted pores are the main space for gas storage, and accounted for about 78% (55% adsorbed gas plus 23% free gas) of the OGIP, while pores in the inorganic matter accommodate 22% free gas of the OGIP. (C) 2016 Elsevier B.V. All rights reserved.

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第 243 条，共 321 条

标题: Assembly of the Lhasa and Qiangtang terranes in central Tibet by divergent double subduction

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摘要: Integration of lithostratigraphic, magmatic, and metamorphic data from the Lhasa-Qiangtang collision zone in central Tibet (including the Bangong suture zone and adjacent regions of the Lhasa and Qiangtang terranes) indicates assembly through divergent double sided subduction. This collision zone is characterized by the absence of Early Cretaceous high-grade metamorphic rocks and the presence of extensive magmatism with enhanced mantle contributions at ca. 120-110 Ma. Two Jurassic-Cretaceous magmatic arcs are identified from the Caima-Duobuza-Rongma-Kangqiong-Amdo magmatic belt in the western Qiangtang Terrane and from the Along Tso-Yanhu-Daguo-Baingoin-Daru Tso magmatic belt in the northern Lhasa Terrane. These two magmatic arcs reflect northward and southward subduction of the Bangong Ocean lithosphere, respectively. Available multidisciplinary data reconcile that the Bangong Ocean may have closed during the Late Jurassic-Early Cretaceous (most likely ca. 140-130 Ma) through arc-arc "soft" collision rather than continent-continent "hard" collision. Subduction zone retreat associated with convergence beneath the Lhasa Terrane may have driven its rifting and separation from the northern margin of Gondwana leading to its accretion within Asia. (C) 2015 Elsevier B.V. All rights reserved.

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标题: Investigation of pore structure and fractal characteristics of organic-rich shale reservoirs: A case study of Lower Cambrian Qiongzhusi formation in Malong block of eastern Yunnan Province, South China

作者: Li, A (Li, Ang); Ding, WL (Ding, Wenlong); He, JH (He, Jianhua); Dai, P (Dai, Peng); Yin, S (Yin, Shuai); Xie, F (Xie, Fei)

来源出版物: MARINE AND PETROLEUM GEOLOGY 卷: 70 页: 46-57 DOI: 10.1016/j.marpetgeo.2015.11.004 出版年: FEB 2016

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摘要: In order to study pore structure and fractal characteristics of the organic-rich marine shale, fourteen shale samples from Lower Cambrian Qjongzhusi formation in Malong block of eastern Yunnan province were investigated by organic geochemical analysis (total organic carbon content analysis and thermal maturity analysis), X-ray diffraction (XRD) analysis, porosity and permeability tests, field emission scanning electron microscopy (FE-SEM), low-pressure nitrogen adsorption and methane adsorption experiments. Fractal dimensions D-1 and D-2 (at relative pressure of 0-0.5 and 0.5-1, respectively) were obtained from the nitrogen adsorption data using the fractal Frenkel-Halsey-Hill (FHH) method. Not only have the relationships among pore structure parameters of shale, the relationships between TOC content, mineral compositions, pore structure parameters and fractal dimensions been discussed, but also the significance of two fractal dimensions D-1 and D-2 and the impact of fractal dimensions on adsorption capacity have been investigated. The results showed that fourteen shale samples have TOC content ranging from 1.25% to 7.72%, two fractal dimensions both increase with the increasing TOC content, and gradually come to a standstill the curves present the shape of "parabola". The major mineralogical compositions of shales are quartz and clay minerals, the quartz contents are between 25.5% and 42.7%, the clay contents are between 26.6% and 44.2%. Fractal dimension D-1 has a negative correlation with quartz contents and a positive correlation with clay minerals contents, but fractal dimension D2 has no apparent relationship with quartz and clay minerals contents. The specific surface area is in the range of 4.98 m(2)/g-19.66 m(2)/g, the total pore volume is between 0.00479 cm(3)/g and 0.01765 cm(3)/g, and the average pore diameter is between 337 nm and 6.02 nm. Two fractal dimensions increase with the increasing surface area and pore volume, and also increase with the decreasing average pore diameter because of. the complicated pore surface and structure of small pores. Further investigation indicates that D-1 represents fractal characteristics from the irregular pore surface, while D-2 represents fractal characteristics related to the complicated pore structure, and shale samples with larger fractal dimensions have higher methane adsorption capacity. Therefore fractal analysis is helpful to have a better understanding of pore structure and adsorption capacity of marine shale. (C) 2015 Elsevier Ltd. All rights reserved.

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标题: Adsorption kinetics of magnetic biochar derived from peanut hull on removal of Cr (VI) from aqueous solution: Effects of production conditions and particle size

作者: Han, YT (Han, Yitong); Cao, X (Cao, Xi); Ouyang, X (Ouyang, Xin); Sohi, SP (Sohi, Saran P.); Chen, JW (Chen, Jiawei)

来源出版物: CHEMOSPHERE 卷: 145 页: 336-341 DOI: 10.1016/j.chemosphere.2015.11.050 出版年: FEB 2016

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摘要: Magnetic biochar was made from peanut hull biomass using iron chloride in a simplified aqueous phase approach and pyrolysis at alternative peak temperatures (450-650 degrees C). Magnetic biochar showed an extreme capacity for adsorption of hexavalent chromium Cr (VI) from aqueous solution, which was 1-2 orders of magnitude higher compared to standard (non-magnetic) biochar from the same feedstock. Adsorption increased with pyrolysis temperature peaking at 77,542 mg kg(-1) in the sample pyrolysed at 650 degrees C. In contrast to magnetic biochar, the low adsorption capacity of standard biochar decreased with increasing pyrolysis temperature. The fine particle size of magnetic biochar and low aqueous pH were also important for adsorption. Surfaces of products from batch adsorption experiments were characterized by scanning electron microscopy, energy-dispersive X-ray analysis, X-ray diffraction, X-ray photoelectron spectroscopy and vibrating sample magnetometer. This revealed that gamma-Fe2O3 was crucial to the properties (adsorbance and magnetism) of magnetic biochar. The removal mechanism was the Cr (VI) electrostatic attracted on protonated -OH on gamma-Fe2O3 surface and it could be desorbed by alkaline solution. Findings suggest that pyrolysis has potential to create effective, magnetically recoverable adsorbents relevant to environmental application. (C) 2015 Elsevier Ltd. All rights reserved.

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第 246 条，共 321 条

标题: Nano-scale pore structure and fractal dimension of organic-rich Wufeng-Longmaxi shale from Jiaoshiba area, Sichuan Basin: Investigations using FE-SEM, gas adsorption and helium pycnometry

作者: Yang, R (Yang, Rui); He, S (He, Sheng); Yi, JZ (Yi, Jizheng); Hu, QH (Hu, Qinhong)

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摘要: Much attention have been recently paid to the upper Ordovician Wufeng shale (O(3)w) and lower Silurian Longmaxi shale (S(1)l) in the Jiaoshiba area of Sichuan Basin, which is now the largest producing shale gas field in China. Field emission scanning electron microscopy (FE-SEM), low pressure gas (N-2 and CO2) adsorption, helium pycnometry, X-ray diffraction and geochemical analyses were performed to investigate the pore structure and fractal dimension of the pores in O(3)w-S(1)l shale formation in the Jiaoshiba area. FE-SEM images show that organic matter (OM) pores are dominant in the organic-rich samples and these pores are often irregular, bubble-like, elliptical and faveolate in shape, while in organic-poor samples, limited and isolated interparticle (interP), intraparticle (intraP) and OM pores are observed. Reversed S-shaped isotherms obtained from nitrogen adsorption are type II, and hysteresis loops:indicate that the shape of micropore in the samples is slit-or plate-like. BET surface areas and total pore volume vary from 12.2 to 27.1 m(2)/g and from 1.8 x 10(-2) to 2.9 x 10(-2) cm(3)/g, with an average of 19.5 m(2)/g and 2.3 x 10(-2) cm(3)/g, respectively. Adsorption volume from both N-2 and CO2 adsorption increases with respect to TOC contents. Porosities obtained from helium porosimetry are comparable with these from gas (CO2 and N-2) adsorption in O(3)w-S(1)l shale. However, porosity determined by quantitative FE-SEM analysis is much smaller, which is mainly related to limited resolution and the small areas of investigation.

Based on the Frenkel-Halsey-Hill (FHH) model of low-pressure N-2 adsorption, fractal dimensions of the pores varied from 2.737 to 2.823. Relationships between pore structure parameters and TOC content, mineral composition and fractal dimension reveal that the fractal dimension is mainly associated with micropores. Samples with higher TOC content, higher quartz content and lower clay content tend to contain more heterogeneous micropores, resulting in higher fractal dimensions and more complicated pore structure in shales. Therefore, fractal dimension is an effective parameter to reflect the complexity of pore structure and the degree of micropore development in O(3)w-S(1)l shale. (C) 2015 Elsevier Ltd. All rights reserved.

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第 247 条，共 321 条

标题: Archean upper crust transition from mafic to felsic marks the onset of plate tectonics

作者: Tang, M (Tang, Ming); Chen, K (Chen, Kang); Rudnick, RL (Rudnick, Roberta L.)

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摘要: The Archean Eon witnessed the production of early continental crust, the emergence of life, and fundamental changes to the atmosphere. The nature of the first continental crust, which was the interface between the surface and deep Earth, has been obscured by the weathering, erosion, and tectonism that followed its formation. We used Ni/Co and Cr/Zn ratios in Archean terrigenous sedimentary rocks and Archean igneous/metaigneous rocks to track the bulk MgO composition of the Archean upper continental crust. This crust evolved from a highly mafic bulk composition before 3.0 billion years ago to a felsic bulk composition by 2.5 billion years ago. This compositional change was attended by a fivefold increase in the mass of the upper continental crust due to addition of granitic rocks, suggesting the onset of global plate tectonics at similar to 3.0 billion years ago.

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第 248 条，共 321 条

标题: Relationships Between Gold and Pyrite at the Xincheng Gold Deposit, Jiaodong Peninsula, China: Implications for Gold Source and Deposition in a Brittle Epizonal Environment

作者: Yang, LQ (Yang, Li-Qiang); Deng, J (Deng, Jun); Wang, ZL (Wang, Zhong-Liang); Guo, LN (Guo, Lin-Nan); Li, RH (Li, Rui-Hong); Groves, DI (Groves, David I.); Danyushevsky, LV (Danyushevsky, Leonid V.); Zhang, C (Zhang, Chao); Zheng, XL (Zheng, Xiao-Li); Zhao, H (Zhao, Hai)

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摘要: The Xincheng gold deposit, hosted by the Early Cretaceous 132 to 123 Ma Guojialing-type granitoids in northwest Jiaodong Peninsula, southeast North China craton, formed about 2 billion years later than regional metamorphism of the Archean Jiaodong basement rocks. The Xincheng deposit comprises mineralized zones with three types of hydrothermal pyrite associated with gold, tellurides, and a variety of sulfides: py(1) as disseminated euhedral to subhedral grains in altered granitoids around quartz veins; py(2) as subhedral grains with brittle cataclastic textures and fractures in quartz-pyrite veins; and py(3) as subhedral, partially corroded crystals in sulfide-rich veins or veinlets. All three generations of pyrite are unzoned and have low trace element contents, including very low lattice-bound gold contents: (py(1): 0.180 ppm; py(2): 0.053 ppm; py(3): 0.060 ppm). Given that there is 10 to 15% pyrite in the ore zone at Xincheng, its very low gold content indicates that it contributes <0.2% of gold to the 7.75 g/t gold in the orebody. Instead, over 99% of the gold is present as discrete electrum and/or gold (total range 0.02-59% silver) grains, which are largely sited in fractures at all scales in pyrite, other ore minerals, and quartz. Importantly, visible gold in py(3) is also sited on solution-corroded pyrite grains. The pyrite textural and geochemical data indicate that it is impossible to derive the high gold-grade orebodies through local remobilization of originally lattice-hound gold in pyrite. Instead, the gold is interpreted to have been deposited through sulfidation reactions and phase separation of a H2O-CO2 ore fluid during progressive brittle cataclastic deformation associated with seismic activity and regional sinistral transtensional shear movement. This concomitant fluid infiltration and deformation caused episodic deposition and fracturing and corrosion of earlier formed pyrite and deposited visible gold in dilational cracks. The coupled development of the transtensional, rather than normal transpressional setting, and precipitation of gold within dilational veins and wall-rock alteration facilitated the deposition of visible gold and an exceptionally high gold tenor. All deposit characteristics indicate that the Xincheng gold deposit is a member of the epizonal orogenic deposit class.

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标题: Tectonic architecture and multiple orogeny of the Qinling Orogenic Belt, Central China

作者: Dong, YP (Dong, Yunpeng); Santosh, M (Santosh, M.)

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摘要: The Qinling Orogenic Belt (QOB) is located between the North China and South China Blocks, and has been considered to have formed by the collision between these blocks. This contribution provides an overview of the composition, nature and ages of the principal tectonic elements including ophiolitic melanges and related volcanic rocks, gabbroic-granitic intrusions, metamorphic basement, sedimentary cover and its provenance in this orogen. The QOB represents a composite orogenic belt that witnessed four major episodes of accretion and collision between discrete continental blocks, such as the North China Block, North Qinling Block and the South China Block. The available geology, geochemistry and geochronology of these tectonic elements together with those of the adjacent regions, can be used to trace the polarity of the four stages of plate subduction, accretion, collision and the related tectonic history as follows. (1) The Grenvillian-aged orogeny along the Kuanping suture between the North Qinling Terrane and North China Block is associated with the southward subduction of Mesoproterozoic Ocean, which led to the amalgamation of the North Qinling Terrane and the North China Block at ca. 1.0 Ga. (2) The Neoproterozoic subduction/accretion as represented by the widely distributed terranes and volcanic-sedimentary rocks, resulted in a wide accretionary wedge formed by the southward accretion to the South China Block. (3) The Paleozoic orogeny along the Shangdan suture between the North and South Qinling Blocks is characterized by Early Paleozoic ocean-continent subduction and a long-lived Late Paleozoic continent-continent subduction. The polarity and detailed evolutionary process of the Early Paleozoic ocean-continent subduction have been constrained by the ophiolitic melange, island-arc related volcanics and intrusions in the North Qinling Belt, as well as the evolutionary history of the Erlangping back-arc basin. The northward subduction and destruction of the Shangdan Ocean during Early Devonian was succeeded by continent-continent subduction beneath the North Qinling Terrane from Middle Devonian to Early Triassic. (4) The Triassic collisional orogeny occurred between the South Qinling Block and South China Block along the Mianlue suture. Silurian rifting along the present Mianlue zone marks the precursor of the eastern Mianlue Ocean, which separated the South Qinling Block from the South China Block during Late Paleozoic. The northward subduction of the ocean led to the Middle Triassic collision between the South China Block and the South Qinling Block. (5) After the collision, the whole QOB evolved into an intra-continental orogen, including Early Jurassic differential tectonics, Late Jurassic to Early Cretaceous compression and thrusting, and Late Cretaceous to Paleogene orogen collapse and depression. These multiple orogenies resulted in abundant mineralization, the genetic types, spatial distribution and metallogenic epochs which correlate well with the tectonics and evolutionary history of the QOB. (C) 2015 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 250 条，共 321 条

标题: Ultrafast ion migration in hybrid perovskite polycrystalline thin films under light and suppression in single crystals

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来源出版物: PHYSICAL CHEMISTRY CHEMICAL PHYSICS 卷: 18 期: 44 页: 30484-30490 DOI: 10.1039/c6cp06496e 出版年: 2016

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摘要: Understanding the influence of light on ion migration in organic-inorganic halide perovskite (OIHP) materials is important to understand the photostability of perovskite solar cells. We reveal that light could greatly reduce the ion migration energy barrier in both polycrystalline and single crystalline OIHP. The activation energies derived from conductivity measurement under 0.25 Sun decrease to less than one half of the values in the dark. A typical ion drift velocity in CH3NH3PbI3 polycrystalline films is 1.2 mu m s(-1) under 1 Sun, compared with 0.016 mu m s(-1) under 0.02 Sun. Ion migration across the photoactive layers in most OIHP devices thus takes only subseconds under 1 Sun illumination, which is much shorter than what it was thought to take. Most important of all, ion migration through a single crystal surface is still too slow to be observed even after illumination for two days due to the large ion diffusion activation energy, >0.38 eV.

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第 251 条，共 321 条

标题: A General and Facile Approach to Heterostructured Core/Shell BiVO4/BiOI p-n Junction: Room-Temperature in Situ Assembly and Highly Boosted Visible-Light Photocatalysis

作者: Huang, HW (Huang, Hongwei); He, Y (He, Ying); Du, X (Du, Xin); Chu, PK (Chu, Paul K.); Zhang, YH (Zhang, Yihe)

来源出版物: ACS SUSTAINABLE CHEMISTRY & ENGINEERING 卷: 3 期: 12 页: 3262-3273 DOI: 10.1021/acssuschemeng.5b01038 出版年: DEC 2015

Web of Science 核心合集中的 "被引频次": 272

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摘要: Development of core/shell heterostructures and semiconductor p-n junctions is of great concern for environmental and energy applications. Herein, we develop a facile in situ deposition route for fabrication of a BiVO4/BiOI composite integrating both the core/shell heterostructure and semiconductor p-n junction at room temperature. In the BiVO4/BiOI core/shell heterostructure, the BiOI nanosheets are evenly assembled on the surface of the BiVO4 cores. The photocatalytic performance is evaluated by monitoring the degradation of the dye model Rhodamine B (RhB), colorless contaminant phenol, and photocurrent generation under visible-light irradiation. The heterostructured BiVO4/BiOI core/shell photocatalyst shows drastically enhanced photocatalysis properties compared to the pristine BiVO4 and BiOI. This remarkable enhancement is attributed to the intimate interfacial interactions derived from the core/shell heterostructure and formation of the p-n junction between the p-type BiOI and n-type BiVO4. Separation and transfer of photogenerated electron hole pairs are hence greatly facilitated, thereby resulting in the improved photocatalytic performance as confirmed by electrochemical, photoelectrochemical, radicals trapping, and superoxide radical (center dot O-2(-)) quantification results. Moreover, the core/shell BiVO4/BiOI also displays high photochemical stability. This work sheds new light on the construction of high-performance photocatalysts with core/shell heterostructures and matchable band structures in a simple and efficient way.

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第 252 条，共 321 条

标题: Robust Feature Matching for Remote Sensing Image Registration via Locally Linear Transforming

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来源出版物: IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING 卷: 53 期: 12 页: 6469-6481 DOI: 10.1109/TGRS.2015.2441954 出版年: DEC 2015

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摘要: Feature matching, which refers to establishing reliable correspondence between two sets of features (particularly point features), is a critical prerequisite in feature-based registration. In this paper, we propose a flexible and general algorithm, which is called locally linear transforming (LLT), for both rigid and nonrigid feature matching of remote sensing images. We start by creating a set of putative correspondences based on the feature similarity and then focus on removing outliers from the putative set and estimating the transformation as well. We formulate this as a maximum-likelihood estimation of a Bayesian model with hidden/latent variables indicating whether matches in the putative set are outliers or inliers. To ensure the well-posedness of the problem, we develop a local geometrical constraint that can preserve local structures among neighboring feature points, and it is also robust to a large number of outliers. The problem is solved by using the expectation-maximization algorithm (EM), and the closed-form solutions of both rigid and nonrigid transformations are derived in the maximization step. In the nonrigid case, we model the transformation between images in a reproducing kernel Hilbert space (RKHS), and a sparse approximation is applied to the transformation that reduces themethod computation complexity to linearithmic. Extensive experiments on real remote sensing images demonstrate accurate results of LLT, which outperforms current state-of-the-art methods, particularly in the case of severe outliers (even up to 80%).

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输出日期: 2023-09-04

第 253 条，共 321 条

标题: New results on stability analysis for systems with discrete distributed delay

作者: Zeng, HB (Zeng, Hong-Bing); He, Y (He, Yong); Wu, M (Wu, Min); She, JH (She, Jinhua)

来源出版物: AUTOMATICA 卷: 60 页: 189-192 DOI: 10.1016/j.automatica.2015.07.017 出版年: OCT 2015

Web of Science 核心合集中的 "被引频次": 284

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摘要: The integral inequality technique is widely used to derive delay-dependent conditions, and various integral inequalities have been developed to reduce the conservatism of the conditions derived. In this study, a new integral inequality was devised that is tighter than existing ones. It was used to investigate the stability of linear systems with a discrete distributed delay, and a new stability condition was established. The results can be applied to systems with a delay belonging to an interval, which may be unstable when the delay is small or nonexistent. Three numerical examples demonstrate the effectiveness and the smaller conservatism of the method. (C) 2015 Elsevier Ltd. All rights reserved.

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输出日期: 2023-09-04

第 254 条，共 321 条

标题: Total organic carbon, organic phosphorus, and biogenic barium fluxes as proxies for paleomarine productivity

作者: Schoepfer, SD (Schoepfer, Shane D.); Shen, J (Shen, Jun); Wei, HY (Wei, Hengye); Tyson, RV (Tyson, Richard V.); Ingall, E (Ingall, Ellery); Algeo, TJ (Algeo, Thomas J.)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 149 页: 23-52 DOI: 10.1016/j.earscirev.2014.08.017 出版年: OCT 2015

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摘要: Although marine productivity is a key parameter in the global carbon cycle, reliable estimation of productivity in ancient marine systems has proven difficult. In this study, we evaluate the accumulation rates of three commonly used proxies for productivity from a set of primarily Quaternary sediment cores at 94 marine sites, compiled from 37 published sources. For each core, mass accumulation rates were calculated for total organic carbon (TOC), organic phosphorus (P-org), and biogenic barium (Ba-bio). Calculated mass accumulation rates were compared to two independent estimates of modern regional primary productivity and export productivity, as well as to two potential controlling variables, bulk accumulation rate (BAR) and redox environment. BAR was found to exercise a strong control on the preservation of organic carbon. The linear regression equations relating preservation factor to BAR can be transformed to yield equations for primary and export production as a function of TOC and BAR, two variables that can be readily measured or estimated in paleomarine systems. Paleoproductivity can also be estimated from empirical relationships between elemental proxy fluxes and modern productivity rates. Although these equations do not attempt to correct for preservation, organic carbon and phosphorus (but not barium) accumulations rates were found to exhibit a systematic relationship to primary and export production. All of the paleoproductivity equations developed here have a large associated uncertainty and, so, must be regarded as yielding order-of-magnitude estimates.

Relationships between proxy fluxes and BAR provide insights regarding the dominant influences on each elemental proxy. Increasing BAR exerts (1) a strong preservational effect on organic carbon that is substantially larger in oxic facies than in suboxic/anoxic facies, (2) a weak clastic-dilution effect that is observable for organic phosphorus (but not for organic carbon or biogenic barium, owing to other dominant influences on these proxies), and (3) a large negative effect on biogenic barium that is probably due to reduced uptake of barium at the sediment water interface. These effects became evident through analysis of our globally integrated dataset; analysis of individual marine sedimentary units most commonly reveals autocorrelations between elemental proxy fluxes and BAR as a result of the latter being a factor in the calculation of the former. We conclude that organic carbon and phosphorus fluxes have considerable potential as widely useful paleoproductivity proxies, but that the applicability of biogenic barium fluxes may be limited to specific oceanic settings. (C) 2014 Elsevier B.V. All rights reserved.

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第 255 条，共 321 条

标题: Free-Matrix-Based Integral Inequality for Stability Analysis of Systems With Time-Varying Delay

作者: Zeng, HB (Zeng, Hong-Bing); He, Y (He, Yong); Wu, M (Wu, Min); She, JH (She, Jinhua)

来源出版物: IEEE TRANSACTIONS ON AUTOMATIC CONTROL 卷: 60 期: 10 页: 2768-2772 DOI: 10.1109/TAC.2015.2404271 出版年: OCT 2015

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摘要: The free-weighting matrix and integral-inequality methods are widely used to derive delay-dependent criteria for the stability analysis of time-varying-delay systems because they avoid both the use of a model transformation and the technique of bounding cross terms. This technical note presents a new integral inequality, called a free-matrix-based integral inequality, that further reduces the conservativeness in those methods. It includes well-known integral inequalities as special cases. Using it to investigate the stability of systems with time-varying delays yields less conservative delay-dependent stability criteria, which are given in terms of linear matrix inequalities. Two numerical examples demonstrate the effectiveness and superiority of the method.

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第 256 条，共 321 条

标题: Ophiolites in the Xing'an-Inner Mongolia accretionary belt of the CAOB: Implications for two cycles of seafloor spreading and accretionary orogenic events

作者: Song, SG (Song, Shuguang); Wang, MM (Wang, Ming-Ming); Xu, X (Xu, Xin); Wang, C (Wang, Chao); Niu, YL (Niu, Yaoling); Allen, MB (Allen, Mark B.); Su, L (Su, Li)

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摘要: The Xing'an-Inner Mongolia accretionary belt in the southeastern segment of the Central Asian Orogenic Belt (CAOB) was produced by the long-lived subduction and eventual closure of the Paleo-Asian Ocean and by the convergence between the North China Craton and the Mongolian microcontinent. Two ophiolite belts have been recognized: the northern Erenhot-Hegenshan-Xi-Ujimqin ophiolite belt and the southern Solonker-Linxi ophiolite belt. Most basalts in the northern ophiolite belt exhibit characteristics of normal-type to enriched-type mid-ocean ridge basalt affinities with depleted Nd isotopic composition (epsilon(Nd)(t)>+5), comparable to modern Eastern Pacific mid-ocean ridge basalts. Most basaltic rocks in the southern belt show clear geochemical features of suprasubduction zone-type oceanic crust, probably formed in an arc/back-arc environment. The inferred back-arc extension along the Solonker-Linxi belt started at circa 280 Ma. Statistics of all the available age data for the ophiolites indicates two cycles of seafloor spreading/subduction, which gave rise to two main epochs of magmatic activity at 500-410 Ma and 360-220 Ma, respectively, with a gap of similar to 50 million years (Myr). The spatial and temporal distribution of the ophiolites and concurrent igneous rocks favor bilateral subduction toward the two continental margins in the convergence history, with final collision at similar to 230-220 Ma. In the whole belt, signals of continental collision and Himalayan-style mountain building are lacking. We thus conclude that the Xing'an-Inner Mongolia segment of the CAOB experienced two cycles of seafloor subduction, back-arc extension, and final "Appalachian-type" soft collision.

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第 257 条，共 321 条

标题: Magmatic record of India-Asia collision

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摘要: New geochronological and geochemical data on magmatic activity from the India-Asia collision zone enables recognition of a distinct magmatic flare-up event that we ascribe to slab breakoff. This tie-point in the collisional record can be used to back-date to the time of initial impingement of the Indian continent with the Asian margin. Continental arc magmatism in southern Tibet during 80-40 Ma migrated from south to north and then back to south with significant mantle input at 70-43 Ma. A pronounced flare up in magmatic intensity (including ignimbrite and mafic rock) at ca. 52-51 Ma corresponds to a sudden decrease in the India-Asia convergence rate. Geological and geochemical data are consistent with mantle input controlled by slab rollback from ca. 70 Ma and slab breakoff at ca. 53 Ma. We propose that the slowdown of the Indian plate at ca. 51 Ma is largely the consequence of slab breakoff of the subducting Neo-Tethyan oceanic lithosphere, rather than the onset of the India-Asia collision as traditionally interpreted, implying that the initial India-Asia collision commenced earlier, likely at ca. 55 Ma.

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第 258 条，共 321 条

标题: Orogenic gold: Common or evolving fluid and metal sources through time

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来源出版物: LITHOS 卷: 233 特刊: SI 页: 2-26 DOI: 10.1016/j.lithos.2015.07.011 出版年: SEP 15 2015

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摘要: Orogenic gold deposits of all ages, from Paleoarchean to Tertiary, show consistency in chemical composition. They are the products of aqueous-carbonic fluids, with typically 5-20 mol% CO2, although unmixing during extreme pressure fluctuation can lead to entrapment of much more CO2-rich fluid inclusions in some cases. Ore fluids are typically characterized by significant concentrations of CH4 and/or N-2, common estimates of 0.01-0.36 mol% H2S, a near-neutral pH of 5.5, and salinities of 3-7 wt% NaCl equiv., with Na > K > > Ca,Mg. This fluid composition consistency favors an ore fluid produced from a single source area and rules out mixing of fluids from multiple sources as significant in orogenic gold formation. Nevertheless, there are broad ranges in more robust fluid-inclusion trapping temperatures and pressures between deposits that support a model where this specific fluid may deposit ore over a broad window of upper to middle crustal depths.

Much of the reported isotopic and noble gas data is inconsistent between deposits, leading to the common equivocal interpretations from studies that have attempted to define fluid and metal source areas for various orogenic gold provinces. Fluid stable isotope values are commonly characterized by the following ranges: (1) delta O-18 for Precambrian ores of + 6 to +11 parts per thousand and for Phanerozoic ores of +7 to +13 parts per thousand; (2) delta D and delta S-34 values that are extremely variable; (3) delta C-13 values that range from -11 to -2 parts per thousand; and (4)delta N-15 of + 10 to + 24 parts per thousand for the Neoarchean, + 6.5 to +12 parts per thousand. for the Paleoproterozoic, and + 1.5 to + 10 parts per thousand for the Phanerozoic. Secular variations in large-scale Earth processes appear to best explain some of the broad ranges in the O, S, and N data. Fluid:rock interaction, particularly in ore trap areas, may cause important local shifts in the O, S, and C ratios. The extreme variations in delta D mainly reflect measurements of hydrogen isotopes by bulk extraction of waters from numerous fluid inclusion generations, many which are not related to ore formation. Radiogenic isotopes, such as those of Pb, Sr, Nd, Sm, and Os, measured on hydrothermal minerals are even more difficult to interpret for defining metal source, particularly as the low-salinity ore fluids transport limited amounts of these elements and significant amounts of these may be locall added to the minerals during alteration reactions at the sites of gold deposition. Noble gas and halogen data are equally equivocal.

Fluid exsolution from granitoids emplaced into the upper and middle crust, metamorphism of the crust, or fluids entering trans-crustal fault zones from below the crust all remain as permissive scenarios associated with orogenic gold formation, as the abundant geochemical data are equivocal. However, geological and geochronological data weigh heavily against a magmatic-hydrothermal model in the upper to middle crust. There is no universal temporal association between orogenic gold and magmatism, and where there is an overlap in age, there is no specific type of magmatism consistently associated with gold formation, nor element zonation around any specific pluton. A crustal metamorphic model for fluid and metal sources is very consistent with geological, geochronological, and geochemical data, although metamorphism on a regional scale that releases these components into major fault zones can be associated with many processes along active continental margins. These can include crustal thickening and radiogenic heating, slab rollback and heating during crustal extension, or subduction of a spreading ridge heating the base of an accretionary prism. In rare examples where Phanerozoic orogenic gold deposits are hosted in Precambrian high-grade metamorphic terranes, fluids and metals must, however, enter a transcrustal fault system from a sub-crustal source. This could either be a devolatilized, subducted, relatively flat, perhaps stalled slab and its overlying sediment, or the corner of the fertilized mantle wedge that releases a fluid during a thermal event. Published by Elsevier B.V.

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标题: Lithospheric Architecture of the Lhasa Terrane and Its Control on Ore Deposits in the Himalayan-Tibetan Orogen

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摘要: Magmatic-hydrothermal ore deposits in collisional orogens are new targets for modern mineral exploration, yet it is unclear why they preferentially occur in some specific tectonic environments within these orogenic belts. We integrate geologic and geochemical data (especially zircon U-Pb dating and Lu-Hf isotope data) for Mesozoic-Cenozoic magmatic rocks and associated ore deposits in the Lhasa terrane, a highly endowed tectonic unit within the Himalayan-Tibetan orogen, and provide the first example in a continental collision terrane of the application of zircon Hf isotope data to image the lithospheric architecture and its relationship with ore deposits.

Three crustal blocks are identified within the Lhasa terrane by the Hf isotope mapping method. They include a central long-lived Precambrian microcontinent with local reworking and two surrounding juvenile Phanerozoic crustal blocks with significant mantle contributions to constituent magmatic rocks. The three crustal blocks are bounded by two E-W-trending terrane-boundary faults, and each block is cut by two N-S striking concealed faults. Isotopic signatures of zircons from the juvenile crustal blocks indicate that the Phanerozoic continental crust grew from several Mesozoic volcanic-plutonic arcs and by underplating of mantle-derived magmas generated during Mesozoic accretion and Cenozoic collision.

Mesozoic subduction-related porphyry Cu-Au deposits and Cenozoic collision-related Cu-Mo deposits are exclusively located in regions with high exf (>5) juvenile crust. Cu enrichment during differentiation of high foe arc magmas is the key for the formation of Mesozoic subduction-related porphyry Cu-Au. By contrast, remelting of the lower crustal Cu sulfide-rich magmatic cumulates within the juvenile crust is interpreted to have played a key role in the formation of Cenozoic collision-related Cu-Mo deposits.

Granite-related Pb-Zn deposits cluster in the oldest crustal regions or developed along the margin of the old crustal block bounded by lithospheric faults. The porphyry Mo deposits are localized along the reworked margins of the old crustal block. It is suggested that crustal reworking released Mo from the old crust to form porphyry Mo deposits, whereas leaching of Pb and Zn from the Paleozoic carbonate cover strata by felsic intrusion-driven fluids is critical to the formation of Pb-Zn ore deposits.

Skarn Fe-Cu ore deposits are typically localized along a terrane boundary fault, i.e., lithospheric discontinuity, through which crust-derived felsic melt mixed with Cu-rich mantle-derived mafic magmas ascending upward. Associated granitoid rocks usually bear microgranular mafic enclaves and show a zircon Hf isotope array from negative to positive Enf values (-7.3 to +6.7), supporting mixing of juvenile mantle and evolved crustal sources.

The Hf isotope maps show temporal-spatial relationships between crustal structure and the location of ore deposits, demonstrating that the structure, nature, and composition of the crust controlled the localization of ore deposits and the migration of ore-forming metals in the terrane. This study shows that the lithospheric architecture of an orogenic terrane can be imaged by Hf isotope mapping to provide mappable units which can be used to explore for ore deposits at the terrane scale.

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第 260 条，共 321 条

标题: Accumulation of floating microplastics behind the Three Gorges Dam

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摘要: We investigated the occurrence and distribution of microplastics in surface water from the Three Gorges Reservoir. Nine samples were collected via trawl sampling with a 112 gm mesh net. The abundances of microplastics were from 3407.7 x 10(3) to 13,617.5 x 10(3) items per square kilometer in the main stream of the Yangtze River and from 192.5 x 10(3) to 11,889.7 x 10(3) items per square kilometer in the estuarine areas of four tributaries. The abundance of microplastics in the main stream of the Yangtze River generally increased as moving closer to the Three Gorges Dam. The microplastics are made exclusively of polyethylene (PE), polypropylene (PP), and polystyrene (PS). Together with microplastics, high abundance of coal/fly ash was also observed in the surface water samples. Comparing with previously reported data, microplastics in the TGR were approximately one to three orders of magnitudes greater, suggesting reservoirs as potential hot spot for microplastic pollution. (C) 2015 Elsevier Ltd. All rights reserved.

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第 261 条，共 321 条

标题: Decratonic gold deposits

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摘要: The North China craton (NCC) hosts numerous gold deposits and is known as the most gold-productive region of China. The gold deposits were mostly formed within a few million years in the Early Cretaceous (130-120 Ma), coeval with widespread occurrences of bimodal magmatism, rift basins and metamorphic core complexes that marked the peak of lithospheric thinning and destruction of the NCC. Stable isotope data and geological evidence indicate that ore-forming fluids and other components were largely exsolved from cooling magma and/or derived from mantle degassing during the period of lithospheric extension. Gold mineralization in the NCC contrasts strikingly with that of other cratons where gold ore-forming fluids were sourced mostly from metamorphic devolatization in compressional or transpressional regimes. In this paper, we present a summary and discussion on time-space distribution and ore genesis of gold deposits in the NCC in the context of the timing, spatial variation, and decratonic processes. Compared with orogenic gold deposits in other cratonic blocks, the Early Cretaceous gold deposits in the NCC are quite distinct in that they were deposited from magma-derived fluids under extensional settings and associated closely with destruction of cratonic lithosphere. We argue that Early Cretaceous gold deposits in the NCC cannot be classified as orogenic gold deposits as previously suggested, rather, they are a new type of gold deposits, termed as "decratonic gold deposits" in this study. The westward subduction of the paleo-West Pacific plate (the Izanagi plate) beneath the eastern China continent gave rise to an optimal tectonic setting for large-scale gold mineralization in the Early Cretaceous. Dehydration of the subducted and stagnant slab in the mantle transition zone led to continuous hydration and considerable metasomatism of the mantle wedge beneath the NCC. As a consequence, the refractory mantle became oxidized and highly enriched in large ion lithophile elements and chalcophile elements (e.g., Cu, Au, Ag and Te). Partial melting of such a mantle would have produced voluminous hydrous, Au- and S-bearing basaltic magma, which, together with crust-derived melts induced by underplating of basaltic magma, served as an important source for ore-forming fluids. It is suggested that the Eocene Carlin-type gold deposits in Nevada, occurring geologically in the deformed western margin of the North America craton, are comparable with the Early Cretaceous gold deposits of the NCC because they share similar tectonic settings and auriferous fluids. The NCC gold deposits are characterized by gold-bearing quartz veins in the Archean amphibolite facies rocks, whereas the Nevada gold deposits are featured by fine-grained sulfide dissemination in Paleozoic marine sedimentary rocks. Their main differences in gold mineralization are the different host rocks, ore-controlling structures, and ore-forming depth. The similar tectonic setting and ore-forming fluid source, however, indicate that the Carlin-type gold deposits in Nevada are actually analogous to decratonic gold deposits in the NCC. Gold deposits in both the NCC and Nevada were formed in a relatively short time interval (< 10 Myr) and become progressively younger toward the subduction zone. Younging of gold mineralization toward subduction zone might have been attributed to retreat of subduction zone and rollback of subducted slab.

According to the ages of gold deposits on inland and marginal zones, the retreat rates of the Izanagi plate in the western Pacific in the Early Cretaceous and the Farallon plate of the eastern Pacific in the Eocene are estimated at 8.8 cm/yr and 3.3 cm/yr, respectively.

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标题: A selective laser melting and solution heat treatment refined Al-12Si alloy with a controllable ultrafine eutectic microstructure and 25% tensile ductility

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摘要: This study shows that a eutectic Al-12Si alloy with controllable ultrafine microstructure and excellent mechanical properties can be achieved by using selective laser melting and subsequent solution heat treatment. This provides a novel and promising approach to the refinement of eutectic Al-Si alloys. Unlike Al-12Si alloys fabricated and refined by traditional methods, the as-fabricated Al-12Si in this study contains nano-sized spherical Si particles surrounding a supersaturated Al matrix. During solution heat treatment, precipitation and coalescence of the Si particles occur, which decreases the Si concentration in the matrix and sub-micron to micron-sized spherical particles embedded in an Al matrix form. The as-fabricated Al-12Si exhibits significantly better tensile properties than the traditionally produced counterparts; while the solution treated Al-12Si has an extremely high ductility of approximately 25%. Importantly, the mechanical properties of the Al-12Si can be tailored through controlling the precipitation and coalescence of the Si particles by varying the solution heat treatment time. A detailed transmission electron microscopy study was conducted to investigate this Al-12Si alloy with ultrafine eutectic microstructure. The excellent tensile properties have been attributed to the refined eutectic microstructure containing spherical Si particles. The formation of this unique microstructure is due to the super heating and an extremely high cooling rate during selective laser melting and the subsequent solution heat treatment, which enables Si to grow along its most stable plane (111)si. Crown Copyright (C) 2015 Published by Elsevier Ltd. on behalf of Acta Materialia Inc. All rights reserved.

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第 263 条，共 321 条

标题: Heterogeneous fenton-like catalytic degradation of 2,4-dichlorophenoxyacetic acid in water with FeS

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来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 273 页: 481-489 DOI: 10.1016/j.cej.2015.03.079 出版年: AUG 1 2015

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摘要: The degradation of herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) in aqueous solution has been studied by heterogeneous Fenton-like process using synthetic FeS as a catalyst, and the properties of FeS were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS). Several operation parameters including pH, FeS dosage, H2O2 concentration and temperature were investigated and the results showed that 2,4-D was efficiently removed from aqueous solution using FeS as a catalyst over a wide range of pH values from 2.0 to 6.5. At the initial pH of 4.5 (without pH adjustment), 10 mM of H2O2, 10 mg/L of 2,4-D and a FeS dose of 0.5 g/L, 2,4-D was almost completely removed within 300 min and the total organic carbon (TOC) removal could reach 70.4%. The degradation intermediates such as 2,4-dichlorophenol, 2-chlorohydroquinone, 4,6-dichlororesorcinol, 2-chlorobenzoquinone, several short-chain acids and chloride ion have been identified by a gas chromatography mass spectrometry (GC-MS) and an ion chromatography (IC). Based on the findings, a possible reaction pathway was proposed. The results of five consecutive experiments indicated the good stability and reusability of FeS and the scavenging experiments revealed that 2,4-D was mainly decomposed by the attack of HO center dot radicals, especially the surface-bounded HO center dot. (C) 2015 Elsevier B.V. All rights reserved.

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第 264 条，共 321 条

标题: A Graphene-like Oxygenated Carbon Nitride Material for Improved Cycle-Life Lithium/Sulfur Batteries

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摘要: Novel sulfur (5) anchoring materials and the corresponding mechanisms for suppressing capacity fading are urgently needed to advance the performance of Li/S batteries. Here, we designed and synthesized a graphene-like oxygenated carbon nitride (OCN) host material that contains tens of micrometer scaled two-dimensional (2D) rippled sheets, micromesopores, and oxygen heteroatoms. N content can reach as high as 20.49 wt %. A sustainable approach of one-step self-supporting solid-state pyrolysis (OSSP) was developed for the low-cost and large-scale production of OCN. The urea in solid sources not only provides self-supporting atmospheres but also produces graphitic carbon nitride (g-C3N4) working as 2D layered templates. The S/OCN cathode can deliver a high specific capacity of 1407.6 mA h g(-1) at C/20 rate with 84% S utilization and retain improved reversible capacity during long-term cycles at high current density. The increasing micropores, graphitic N, ether, and carboxylic 0 at the large sized OCN sheet favor S utilization and trapping for polysulfides.

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第 265 条，共 321 条

标题: Early Paleozoic and Early Mesozoic intraplate tectonic and magmatic events in the Cathaysia Block, South China

作者: Shu, LS (Shu, Liangshu); Wang, B (Wang, Bo); Cawood, PA (Cawood, Peter A.); Santosh, M (Santosh, M.); Xu, ZQ (Xu, Zhiqin)

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摘要: The geodynamic framework of the South China Craton in the Early Paleozoic and Early Mesozoic has been modeled as developing through either oceanic convergence or intracontinental settings. On the basis of an integrated structural, geochemical, zircon U-Pb and Hf isotopic, and mica 40Ar/39Ar geochronologic study we establish that an intracontinental setting is currently the best fit for the available data. Our results suggest that widespread tectonomagmatic activity involving granite emplacement and mylonitic deformation occurred during two distinct stages: similar to 435-415 Ma and similar to 230-210 Ma. The coeval nature of emplacement of the plutons and their ductile deformation is corroborated by the subparallel orientation of the mylonitic foliation along the pluton margins, gneissose foliation in the middle part of pluton, the magmatic foliation within the plutons, and the schistosity in the surrounding metamorphosed country rocks. The 435-415 Ma granitoids exhibit peraluminous, high-K characteristics, and zircons show negative epsilon Hf(t) values (average -6.2, n =66), and Paleoproterozoic two-stage model ages of circa 2.21-1.64 Ga (average 1.84 Ga). The data suggest that the Early Paleozoic plutons were derived from the partial melting of the Paleoproterozoic basement of the Cathaysia Block. The 230-210 Ma granites are potassic and have zircons with Hf(t) values of -2.8 - -8.7 (average 5.4, n =62), corresponding to T-DM2 ages ranging from 2.0 to 1.44 Ga (average 1.64 Ga), suggesting that the Early Mesozoic partial melts in Cathaysia were also derived from basement. The geochemical distinction between the two phases of granites traces continental crustal evolution with time, with the Early Mesozoic crust enriched in potassium, silicon, and aluminum, but deficient in calcium, relative to the Paleozoic crust. Kinematical investigations provide evidence for an early-stage ductile deformation with a doubly vergent thrusting pattern dated at 433 +/- 1 to 428 +/- 1 Ma (40Ar/39Ar furnace step-heating pseudoplateau ages obtained on muscovite and biotite from mylonite and deformed granite) and a late-stage strike-slip movement with sinistral sense of ductile shearing at 232 +/- 1 to 234 +/- 1 Ma (40Ar/39Ar furnace step-heating pseudoplateau ages) along an E-W direction. The geological, geochemical, and isotopic signatures likely reflect far-field effects in response to continental assembly events at these times.

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输出日期: 2023-09-04

第 266 条，共 321 条

标题: Anionic Group Self-Doping as a Promising Strategy: Band-Gap Engineering and Multi-Functional Applications of High-Performance CO32--Doped Bi2O2CO3

作者: Huang, HW (Huang, Hongwei); Li, XW (Li, Xiaowei); Wang, JJ (Wang, Jinjian); Dong, F (Dong, Fan); Chu, PK (Chu, Paul K.); Zhang, TR (Zhang, Tierui); Zhang, YH (Zhang, Yihe)

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摘要: We herein demonstrate self-doping of the CO32- anionic group into a wide bandgap semiconductor Bi2O2CO3 realized by a one-pot hydrothermal technique. The photoresponsive range of the self-doped Bi2O2CO3 can be extended from UV to visible light and the band gap can be continuously tuned. Density functional theory (DFT) calculation results demonstrate that the foreign CO32- ions are doped in the caves constructed by the four adjacent CO32- ions and the CO32- self-doping can effectively narrow the band gap of Bi2O2CO3 by lowering the conduction band position and meanwhile generating impurity level. The photocatalytic performance is evaluated by monitoring NO removal from the gas phase, photodegradation of a colorless contaminant (bisphenol A, BPA) in an aqueous solution, and photocurrent generation. In comparison with the pristine Bi2O2CO3 which is not sensitive to visible light, the self-doped Bi2O2CO3 exhibits drastically enhanced visible-light photoreactivity, which is also superior to that of many other well-known photocatalysts such as P25, C3N4, and BiOBr. The highly enhanced photocatalytic performance is attributed to combination of both efficient visible light absorption and separation of photogenerated electron hole pairs. The self-doped Bi2O2CO3 also shows decent photochemical stability, which is of especial importance for its practical applications. This work demonstrates that self-doping with an anionic group enables the band gap engineering and the design of high-performance photocatalysts sensitive to visible light.

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第 267 条，共 321 条

标题: Effects of vegetation on runoff and soil erosion on reclaimed land in an opencast coal-mine dump in a loess area

作者: Zhang, L (Zhang, Ling); Wang, JM (Wang, Jinman); Bai, ZK (Bai, Zhongke); Lv, CJ (Lv, Chunjuan)

来源出版物: CATENA 卷: 128 页: 44-53 DOI: 10.1016/j.catena.2015.01.016 出版年: MAY 2015

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摘要: Vegetation reconstruction on opencast coal-mine dumps is an effective way to reduce runoff and soil erosion and is a key to restoring ecosystems in ecologically sensitive regions. To investigate the effects of vegetation on runoff and erosion, a field experiment involving eight erosion plots was conducted on a dump at the Antaibao opencast coal mine in, Shanxi Province. The plots were divided into two location groups, platforms and slopes. Each plot was planted with a typical vegetation pattern. The volumes of runoff and soil erosion during each rainfall event were recorded during the rainy season. The results showed that plots on the platforms experienced a larger volume of runoff than plots on the slopes, while the slope plots generated a larger value of soil erosion than the platform plots. Vegetation restoration has different impacts on runoff and soil erosion. A plot covered with 1-year-old Robinia pseudoacacia and Hippophae rhamnoides was most effective in terms of soil conservation; the plots covered with 5-year-old mixed legume plants and 5-year-old mixed grass-shrub-arbor forest were most effective overall in preventing both runoff and soil erosion. Over the long term, vegetation can increase soil organic matter, improve soil physical properties and soil anti-erodibility, and reduce runoff and erosion to a safe level. This study provides a theoretical basis and technical support for land reclamation and soil and water conservation in vulnerable ecological mining regions of a loess plateau. (C) 2015 Elsevier B.V. All rights reserved.

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第 268 条，共 321 条

标题: Rise to modern levels of ocean oxygenation coincided with the Cambrian radiation of animals

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来源出版物: NATURE COMMUNICATIONS 卷: 6 文献号: 7142 DOI: 10.1038/ncomms8142 出版年: MAY 2015

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摘要: The early diversification of animals (similar to 630 Ma), and their development into both motile and macroscopic forms (similar to 575-565 Ma), has been linked to stepwise increases in the oxygenation of Earth's surface environment. However, establishing such a linkage between oxygen and evolution for the later Cambrian 'explosion' (540-520 Ma) of new, energysapping body plans and behaviours has proved more elusive. Here we present new molybdenum isotope data, which demonstrate that the areal extent of oxygenated bottom waters increased in step with the early Cambrian bioradiation of animals and eukaryotic phytoplankton. Modern-like oxygen levels characterized the ocean at similar to 521Ma for the first time in Earth history. This marks the first establishment of a key environmental factor in modern-like ecosystems, where animals benefit from, and also contribute to, the 'homeostasis' of marine redox conditions.

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第 269 条，共 321 条

标题: RECENT ADVANCES ON FRACTAL MODELING OF PERMEABILITY FOR FIBROUS POROUS MEDIA

作者: Cai, JC (Cai, Jianchao); Luo, L (Luo, Liang); Ye, R (Ye, Ran); Zeng, XF (Zeng, Xiangfeng); Hu, XY (Hu, Xiangyun)

来源出版物: FRACTALS-COMPLEX GEOMETRY PATTERNS AND SCALING IN NATURE AND SOCIETY 卷: 23 期: 1 文献号: 1540006 DOI: 10.1142/S0218348X1540006X 出版年: MAR 2015

Web of Science 核心合集中的 "被引频次": 105

被引频次合计: 106

摘要: Permeability is an important hydraulic parameter for characterizing heat and mass transfer properties of fibrous porous media. However, it is difficult to be quantitatively predicted due to the complex and irregular pore structure of fibrous porous media. Fractal geometry has been verified to be an effective method for determining the permeability of fibrous porous media. In this study, recent works on the permeability of fibrous porous media by means of fractal geometry are reviewed, the advances for each presented fractal model are analyzed and summarized, parameter equations used in available fractal permeability models are also briefly compared and reviewed. Future work for more generalized permeability model of fibrous porous media need to conducted by considering the special characters of fibrous materials, uniform pore structure parameter model and the influence factor of capillary pressure, electrokinetic phenomena, etc.

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第 270 条，共 321 条

标题: A genetic linkage between subduction- and collision-related porphyry Cu deposits in continental collision zones

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来源出版物: GEOLOGY 卷: 43 期: 3 页: 247-250 DOI: 10.1130/G36362.1 出版年: MAR 2015

Web of Science 核心合集中的 "被引频次": 330

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摘要: The genesis of continental collision-related porphyry Cu deposits (PCDs) remains controversial. The most common hypothesis links their genesis with magmas derived from subduction-modified arc lithosphere. However, it is unclear whether a genetic linkage exists between collision-and subduction-related PCDs. Here, we studied Jurassic subduction-related Cu-Au and Miocene collision-related Cu-Mo porphyry deposits in south Tibet. The Jurassic PCDs occur only in the western segment of the Jurassic arc, which has depleted mantle-like isotopic compositions [e.g., (Sr-87/Sr-86)(i) = 0.7041-0.7048; epsilon(Nd(t)) as high as 7.5, and epsilon(Hf(t)) as high as 18]. By contrast, no Jurassic PCDs have been found in the eastern arc segment, which is isotopically less juvenile [e.g., (Sr-87/Sr-86)(i) = 0.7041-0.7063, epsilon(Nd(t)) < 4.5, and epsilon(Hf(t)) <= 12]. These results imply that incorporation of crustal components during underplating of Jurassic magma induced copper accumulation as sulfides at the base of the eastern Jurassic arc, inhibiting PCD formation at this time. Miocene PCDs are spatially confined to the Jurassic arc, and the giant Miocene PCDs cluster in its eastern segment where no Jurassic PCDs occur. This suggests that the arc segment barren for subduction-related PCDs could be fertile for collision-related PCDs. Miocene ore-forming porphyries have young Hf model ages and Sr-Nd-Hf isotopic compositions overlapping with those of the Jurassic rocks in the eastern segment, whereas contemporaneous barren porphyries outside the Jurassic arc have abundant zircon inheritance and crustlike Sr-Nd-Hf isotopic compositions. These data suggest that remelting of the lower crustal sulfide-bearing Cu-rich Jurassic cumulates, triggered by Cenozoic crustal thickening and/or subsequent slab break-off, led to the formation of giant Miocene PCDs. The spatial overlap and complementary metal endowment between subduction-and collision-related magmas may be used to evaluate the mineral potential for such deposits in other orogenic belts.

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第 271 条，共 321 条

标题: Hidden Attractors and Dynamical Behaviors in an Extended Rikitake System

作者: Wei, ZC (Wei, Zhouchao); Zhang, W (Zhang, Wei); Wang, Z (Wang, Zhen); Yao, MH (Yao, Minghui)

来源出版物: INTERNATIONAL JOURNAL OF BIFURCATION AND CHAOS 卷: 25 期: 2 文献号: 1550028 DOI: 10.1142/S0218127415500285 出版年: FEB 2015

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摘要: In this paper, an extended Rikitake system is studied. Several issues, such as Hopf bifurcation, coexistence of stable equilibria and hidden attractor, and dynamics analysis at infinity are investigated either analytically or numerically. Especially, by a simple linear transformation, the wide range of hidden attractors is noticed, and the Lyapunov exponents diagram is given. The obtained results show that the unstable periodic solution generated by Hopf bifurcation leads to the hidden attractor. The existence of hidden attractors that may render the system's behavior unpredictable not only depends on the value of system parameters but also on the value of initial conditions. The phenomena are important and potentially problematic in engineering applications.

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第 272 条，共 321 条

标题: "Wave" Signal-Smoothing and Mercury-Removing Device for Laser Ablation Quadrupole and Multiple Collector ICPMS Analysis: Application to Lead Isotope Analysis

作者: Hu, ZC (Hu, Zhaochu); Zhang, W (Zhang, Wen); Liu, YS (Liu, Yongsheng); Gao, S (Gao, Shan); Li, M (Li, Ming); Zong, KQ (Zong, Keqing); Chen, HH (Chen, Haihong); Hu, SH (Hu, Shenghong)

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摘要: A novel wave signal-smoothing and mercury-removing device has been developed for laser ablation quadrupole and multiple collector ICPMS analysis. With the wave stabilizer that has been developed, the signal stability was improved by a factor of 6.6-10 and no oscillation of the signal intensity was observed at a repetition rate of 1 Hz. Another advantage of the wave stabilizer is that the signal decay time is similar to that without the signal-smoothing device (increased by only 1-2 s for a signal decay of approximately 4 orders of magnitude). Most of the normalized elemental signals (relative to those without the stabilizer) lie within the range of 0.9-51.0 with the wave stabilizer. Thus, the wave stabilizer device does not significantly affect the aerosol transport efficiency. These findings indicate that this device is well-suited for routine optimization of ICPMS, as well as low repetition rate laser ablation analysis, which provides smaller elemental fractionation and better spatial resolution. With the wave signal-smoothing and mercury-removing device, the mercury gas background is reduced by 1 order of magnitude. More importantly, the Hg-202 signal intensity produced in the sulfide standard MASS-1 by laser ablation is reduced from 256 to 0.7 mV by the use of the wave signal-smoothing and mercury-removing device. This result suggests that the mercury is almost completely removed from the sample aerosol particles produced by laser ablation with the operation of the wave mercury-removing device. The wave mercury-removing device that we have designed is very important for Pb isotope ratio and accessory mineral U-Pb dating analysis, where removal of the mercury from the background gas and sample aerosol particles is highly desired. The wave signal-smoothing and mercury-removing device was applied successfully to the determination of the 206Pb/204Pb isotope ratio in samples with low Pb content and/or high Hg content.

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第 273 条，共 321 条

标题: Fabrication of Multiple Heterojunctions with Tunable Visible-Light-Active Photocatalytic Reactivity in BiOBr-BiOl Full-Range Composites Based on Microstructure Modulation and Band Structures

作者: Huang, HW (Huang, Hongwei); Han, X (Han, Xu); Li, XW (Li, Xiaowei); Wang, SC (Wang, Shichao); Chu, PK (Chu, Paul K.); Zhang, YH (Zhang, Yihe)

来源出版物: ACS APPLIED MATERIALS & INTERFACES 卷: 7 期: 1 页: 482-492 DOI: 10.1021/am5065409 出版年: JAN 14 2015

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ESI 热点论文: N

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第 274 条，共 321 条

标题: Recent progress in luminescence tuning of Ce3+ and Eu2+-activated phosphors for pc-WLEDs

作者: Li, GG (Li, Guogang); Tian, Y (Tian, Ying); Zhao, Y (Zhao, Yun); Lin, J (Lin, Jun)

来源出版物: CHEMICAL SOCIETY REVIEWS 卷: 44 期: 23 页: 8688-8713 DOI: 10.1039/c4cs00446a 出版年: 2015

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被引频次合计: 702

摘要: Nowadays, phosphor converted white light-emitting diodes (pc-WLEDs) have been widely used in solid-state lighting and display areas due to their superior lifetime, efficiency, and reliability as well as significant reduction in power consumption. Phosphors are indispensable components of pc-WLED devices, and their luminescence properties determine the quality of WLED lighting and displays. In order to further achieve high luminous efficacy, chromatic stability, and color-rending properties in pc-WLEDs, much effort has been focused on improving current pc-WLED phosphors and developing novel pc-WLED phosphors recently. This review article concerns commonly used rare earth ion (Eu2+ and Ce3+) activated inorganic phosphors, highlighting the important effect of spectral tuning via local structural variations on improving the luminescence performance of phosphors. The main spectral tuning strategies are discussed in detail and summarized, including (1) doping level control; (2) cationic substitution; (3) anionic substitution; (4) cationic-anionic substitution; (5) the crystal-site engineering approach; (6) mixing of nanophases.

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第 275 条，共 321 条

标题: Mediator-free direct Z-scheme photocatalytic system: BiVO4/g-C3N4 organic-inorganic hybrid photocatalyst with highly efficient visible-light-induced photocatalytic activity

作者: Tian, N (Tian, Na); Huang, HW (Huang, Hongwei); He, Y (He, Ying); Guo, YX (Guo, Yuxi); Zhang, TR (Zhang, Tierui); Zhang, YH (Zhang, Yihe)

来源出版物: DALTON TRANSACTIONS 卷: 44 期: 9 页: 4297-4307 DOI: 10.1039/c4dt03905j 出版年: 2015

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被引频次合计: 311

摘要: We disclose the fabrication of a mediator-free direct Z-scheme photocatalyst system BiVO4/g-C3N4 using a mixed-calcination method based on the more reliable interfacial interaction. The facet coupling occurred between the g-C3N4 (002) and BiVO4 (121), and it was revealed by X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS) and transmission electron microscope (TEM). The crystal structure and optical properties of the as-prepared samples have also been characterized by Fourier-transform infrared (FTIR), scanning electron microscopy (SEM) and UV-vis diffuse reflectance spectra (DRS) in details. The photocatalytic experiments indicated that the BiVO4/g-C3N4 composite photocatalysts display a significantly enhanced photocatalytic activity pertaining to RhB degradation and photocurrent generation (PC) compared to the pristine BiVO4 and g-C3N4. This remarkably improved photocatalytic performance should be attributed to the fabrication of a direct Z-scheme system of BiVO4/g-C3N4, which can result in a more efficient separation of photoinduced charge carriers than band-band transfer, thus endowing it with the much more powerful oxidation and reduction capability, as confirmed by the photoluminescence (PL) spectra and electrochemical impedance spectra (EIS). The Z-scheme mechanism of BiVO4/g-C3N4 heterostructure was verified by a series of combined techniques, including the active species trapping experiments, NBT transformation and terephthalic acid photoluminescence probing technique (TA-PL) over BiVO4/g-C3N4 composites and the pristine samples. The present work not only furthered the understanding of mediator-free Z-scheme photocatalysis, but also shed new light on the design of heterostructural photocatalysts with high-performance.

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ESI 热点论文: N

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第 276 条，共 321 条

标题: Compositional polarity of Triassic granitoids in the Qinling Orogen, China: Implication for termination of the northernmost paleo-Tethys

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摘要: The Qinling Orogen was formed from the closure of the northernmost paleo-Tethys sea and the tectonic suturing of the Yangtze and North China Cratons. The timing of this collision and the tectonic framework are debated. The widely developed Triassic granitoids in the western Qinling Orogen offer a key to understand the tectonic evolution of this region. Here we compile the geological, geochemical and geochronological data of the Triassic granitoids from the Qingling Orogen and conclude that the granitoids north of the Mian-Lue Suture were emplaced in an active continental margin related to the northward subduction of the Mian-Lue oceanic plate during 248 - 200 Ma. The granitoids can be classified into I- and S-types, with the former constituting the major variety. Northward from the Mian-Lue Fault, an S-type granite belt appears, followed by and locally overlapping with an I-type granite belt. The I-type granite belt can be subdivided into four sub-belts from south to north, with increasing contents of K2O, K2O + Na2O, SiO2, Th and U, and the ratios of K2O/Na2O, Rb/Sr and (Sr-87/Sr-86)(i), but decreasing contents of Na2O, Al2O3, Mg#, and epsilon Hf(t), except for the northernmost belt which occurs in the Huaxiong Block of the North China Craton. This geochemical polarity of I-type granitoids and the zoned distribution of S- and I-types granitoids cannot be explained through continental collision orogeny (including syn- to post-collision), but can be well interpreted by considering the progressive subduction of the northernmost branch of the paleo-Tethys, as represented by the Mian-Lue Ocean. Thus, the termination of the northernmost paleo-Tethys and the onset of the continental collision between the Yangtze and the North China plates are considered to have occurred at about 200 Ma, during the transition from Triassic to Jurassic. Our model is also supported by the available data from other studies and provides a revised framework for the timing and tectonics of assembly of the Yangtze and the North China Cratons. (C) 2013 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Bi2O2(OH)(NO3) as a desirable [Bi2O2](2+) layered photocatalyst: strong intrinsic polarity, rational band structure and {001} active facets co-beneficial for robust photooxidation capability

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摘要: Developing high-performance photocatalytic materials is of huge significance and highly desirable for fulfilling the pressing need in environmental remediation. In this work, we demonstrate the use of bismuth nitrate Bi2O2(OH)(NO3) as an absorbing photocatalyst, which integrates multiple superiorities, like a [Bi2O2](2+) layered configuration, a non-centrosymmetric (NCS) polar structure and highly reactive {001} facets. Bi2O2(OH)(NO3) nanosheets are obtained by a facile one-pot hydrothermal route using Bi(NO3)(3)center dot 5H(2)O as the sole raw material. Photocatalysis assessment revealed that Bi2O2(OH)(NO3) holds an unprecedented photooxidation ability in contaminant decomposition, far out-performing the well-known photocatalysts BiPO4, Bi2O2CO3, BiOCl and P25 (commercial TiO2). Particularly, it displays a universally powerful catalytic activity against various stubborn industrial contaminants and pharmaceuticals, including phenol, bisphenol A, 2,4-dichlorophenol and tetracycline hydrochloride. In-depth experimental and density functional theory (DFT) investigations co-uncovered that the manifold advantages, such as large polarizability and rational band structure, as well as exposed {001} active facets, induced robust generation of strong oxidating superoxide radicals (center dot O-2(-)) in the conduction band and hydroxyl radicals ((OH)-O-center dot) in the valence band, thus enabling Bi2O2(OH)(NO3) to have a powerful and durable photooxidation capability. Bi2O2(OH)(NO3) also presents high photochemical stability. This work not only rendered a highly active and stable photocatalyst for practical applications, but also laid a solid foundation for future initiatives aimed at designing new photoelectronic materials by manipulating multiple advantageous factors.

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标题: Ages and magnetic structures of the South China Sea constrained by deep tow magnetic surveys and IODP Expedition 349

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摘要: Combined analyses of deep tow magnetic anomalies and International Ocean Discovery Program Expedition 349 cores show that initial seafloor spreading started around 33 Ma in the northeastern South China Sea (SCS), but varied slightly by 1-2 Myr along the northern continent-ocean boundary (COB). A southward ridge jump of approximate to 20 km occurred around 23.6 Ma in the East Subbasin; this timing also slightly varied along the ridge and was coeval to the onset of seafloor spreading in the Southwest Subbasin, which propagated for about 400 km southwestward from approximate to 23.6 to approximate to 21.5 Ma. The terminal age of seafloor spreading is approximate to 15 Ma in the East Subbasin and approximate to 16 Ma in the Southwest Subbasin. The full spreading rate in the East Subbasin varied largely from approximate to 20 to approximate to 80 km/Myr, but mostly decreased with time except for the period between approximate to 26.0 Ma and the ridge jump (approximate to 23.6 Ma), within which the rate was the fastest at approximate to 70 km/Myr on average. The spreading rates are not correlated, in most cases, to magnetic anomaly amplitudes that reflect basement magnetization contrasts. Shipboard magnetic measurements reveal at least one magnetic reversal in the top 100 m of basaltic layers, in addition to large vertical intensity variations. These complexities are caused by late-stage lava flows that are magnetized in a different polarity from the primary basaltic layer emplaced during the main phase of crustal accretion. Deep tow magnetic modeling also reveals this smearing in basement magnetizations by incorporating a contamination coefficient of 0.5, which partly alleviates the problem of assuming a magnetic blocking model of constant thickness and uniform magnetization. The primary contribution to magnetic anomalies of the SCS is not in the top 100 m of the igneous basement.

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标题: Factors Affecting Improvement of Engineering Properties of MICP-Treated Soil Catalyzed by Bacteria and Urease

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摘要: Microbial induced calcite precipitation (MICP) is one of the potential methods for improvement of engineering properties of soil. A laboratory study was conducted to investigate the influence of various factors on engineering properties of MICP-treated soil catalyzed by bacteria and ureases. Some of these factors include bacteria concentration, urease concentration, cementation media concentration, reaction time, type of sand, and curing conditions. The experiments of MICP catalyzed by Sporosarcina pasteurii and urease were conducted in similar conditions. The soil samples were prepared with full contact flexible molds (FCFMs). The results of unconfined compression test show that the experimental factors (bacteria/urease concentration, cementation media concentration, reaction time, and type of sand) have a significant impact on the MICP process and engineering properties of sand treated by both bacteria and urease, whereas the curing conditions has a small effect. The unconfined compression strength (approximately 1.76-2.04MPa) of bacteria treated samples is almost 5x (approximately 0.33-0.43MPa) that of urease treated samples under similar urease activity. The MICP process catalyzed by bacteria is much more effective than the process catalyzed by urease in terms of engineering soil properties improvement.

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标题: Cenozoic tectono-magmatic and metallogenic processes in the Sanjiang region, southwestern China

作者: Deng, J (Deng, Jun); Wang, QF (Wang, Qingfei); Li, GJ (Li, Gongjian); Santosh, M (Santosh, M.)

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摘要: The Sanjiang region in SE Tibet Plateau, and the western Yunnan region in southwestern China constitute a collage of Gondwana-derived micro-continental blocks and arc terranes that were accreted together after the closure of the Paleotethys Oceans in Permo-Triassic. The lithospheric structure in Sanjiang prior to the Cenozoic was dominantly characterized by sub-parallel sutures, subduction-modified mantle and crust, Mesozoic basins between the sutures, and primary polymetallic accumulations. During the Cenozoic, intense deformation, episodic magmatism, and diverse mineralization occurred, jointly controlled by the underthrust of South China litho-sphere and the subduction of Pacific plate to the east, the India-Eurasia continental collision and the subduction of Indian oceanic plate to the west. In this paper, we identify the following four main phases for the Cenozoic evolution in the Sanjiang region. (i) Subduction and rollback of Neotethyan oceanic plate before ca. 45-40 Ma caused lithosphere shortening, indicated by folding-thrusting in the shallow crust and horizontal shearing in middle crust, and multiple magmatic activities, with associated formation of Sn ore deposits in the Tengchong block, Cu polymetallic ore deposits within Mesozoic basins, and Mo and Pb-Zn ore deposits in the Cangyuan area nearby the Changning-Menglian suture. (ii) Breakoff of Neotethyan slab in 45-40 Ma in combination with the India-Eurasia continental hard collision caused the diachronous removal of the lower lithospheric mantle during 42-32 Ma, with the resultant potassic-ultrapotassic magmatism and formation of the related porphyry-skarn ore deposits along the Jinshajiang-Ailaoshan suture. (iii) Underthrusting of the South China plate resulting in the kinking of Sanjiang, expressed by block rotation, extrusion, and shearing in the southern Sanjiang during 32-10 Ma, with contemporary formation of the orogenic gold deposit along shear zones and the MVT Pb-Zn ore deposits within Mesozoic basins. (iv) Subduction of Indian oceanic plate possibly together with the Ninety East Ridge caused the local extension and volcanism in western Sanjiang, and the interplay between India-Eurasia collision and the Pacific plate subduction induced tensile stress and mantle perturbation in eastern Sanjiang from ca. 10 Ma to present. The Cenozoic tectonic process traces a continuum of lithosphere shortening, sub-lithosphere mantle removal, and lithosphere underthrusting. During the lithospheric mantle removal, the simultaneous melting of the metasomatized lithospheric mantle and juvenile lower crust with possible metal enrichment contributed to the formation of potassic-ultrapotassic intrusive rocks and related porphyry-skarn mineralization. It is proposed that the kinking in the Sanjiang region was controlled by the non-coaxial compressions of the South China block and India continent, which are much larger in size than the blocks in Sanjiang. The underthrust continental lithosphere of the South China block caused the formation of orogenic gold deposits due to the release of metamorphic fluids from the front of the underthrust zone and the development of MVT Pb-Zn deposits via fluid circulation in the farther metal-enriched Mesozoic basins. Our study reveals that the pre-Cenozoic lithospheric structure in Sanjiang played an important role in the styles of tectonic movement, the nature and spatial distribution of magmatism, and the large-scale metallogeny during the Cenozoic. (C) 2014 Elsevier B.V. All rights reserved.

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标题: Hidden Hyperchaotic Attractors in a Modified Lorenz-Stenflo System with Only One Stable Equilibrium

作者: Wei, ZC (Wei, Zhouchao); Zhang, W (Zhang, Wei)

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摘要: This paper reports the finding of a four-dimensional (4D) non-Sil'nikov autonomous system with three quadratic nonlinearities, which exhibits some behavior previously unobserved: hidden hyperchaotic attractors with only one stable equilibrium. The algebraical form of the non-Sil'nikov chaotic attractor is very similar to the hyperchaotic Lorenz-Stenflo system but they are different and, in fact, nonequivalent in topological structures. Of particular interest is the fact this system has only one stable equilibrium, but can exhibit hidden hyperchaos, chaos, periodic orbit. Moreover, the coexistence of attracting sets can be obtained in the system for some parameter values and different initial conditions, such as hyperchaotic attractor and point, hyperchaotic attractor and period orbit. To further analyze the new system, the ultimate bound and positively invariant set for the modified hyperchaotic Lorenz-Stenflo system are also obtained. Moreover, the complete mathematical characterizations for 4D Hopf bifurcation are rigorously derived and studied.

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第 282 条，共 321 条

标题: Tethys tectonic evolution and its bearing on the distribution of important mineral deposits in the Sanjiang region, SW China

作者: Deng, J (Deng, Jun); Wang, QF (Wang, Qingfei); Li, GJ (Li, Gongjian); Li, CS (Li, Chusi); Wang, CM (Wang, Changming)

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摘要: The Sanjiang region in SE Tibet Plateau and NW Yunnan is known to have formed by amalgamation of Gondwana-derived continental blocks and arc terranes as a result of oceanic subduction followed by continental collision from Paleozoic to Mesozoic. In this paper we provide a synthesis of tectonic evolution, magmatism and metallogeny in the region based on data from literatures. Early Paleozoic ophiolites (473-439 Ma) in the Changning-Menglian belt indicate the existence of a Proto-Tethys ocean in this region. Two episodes of subduction-related magmatism in the early-Paleozoic, one occurred in the Baoshan and Tengchong blocks at 502-455 Ma and the other occurred in the Simao block at 421-401 Ma, are regarded as evidence for two different events of subduction of the Proto-Tethys ocean at different locations. The Proto-Tethys was succeeded in early-Devonian by the Paleo-Tethys which comprised the main ocean and three branches: Ailaoshan, Jinshajiang and Garze-Litang. The Changning-Menglian main ocean existed from middle-Devonian to middle-Triassic. The remnants of the oceanic crust are preserved in a few places in the Longmu Tso-Shuanghu suture as well as in the Changning-Menglian ophiolite belt. The eastward subduction of the main oceanic plate from early-Permian to early-Triassic formed a prominent arc terrane stretching > 1500 km from Yunnan to eastern Tibet. From the waning stage of subduction to post-subduction, numerous S-type granite plutons with ages varying between 230 and 219 Ma, such as the Lincang batholith in Yunnan were emplaced at or close to the suture. This event produced several hydrothermal W-Sn deposits in the region. The tectonic evolution and associated magmatism of the Jinshajiang and Ailaoshan branch oceans are generally comparable to those of the main ocean. However, the branch oceans were subducted westward instead. The Garze-Litang branch ocean also underwent westward subduction from middle-Devonian to late-Triassic. Arc-related high Sr/Y porphyry intrusions and associated porphyry-skarn Cu-Mo-Au deposits are common in the Jinshajiang-Ailaoshan region, especially in the Yidun arc which formed prior to Jurassic. The VMS deposits in the Sanjiang region formed in diverse tectonic settings including middle-Silurian back-arc basins, Carboniferous oceanic islands, Paleozoic subduction zones and Triassic post-subduction rifting environments. The Mesozoic and early-Cenozoic evolution of the Baoshan and Tengchong blocks was largely influenced by eastward oceanic subduction of the Meso- and Neo-Tethys from late-Permian to middle-Cretaceous and from late-Cretaceous to similar to 50 Ma, respectively. Abundant early-Cretaceous granitoids and associated skarn-type Pb-Zn and Sn-Fe deposits in the Baoshan and Tengchong blocks were produced in the background of the Shan boundary oceanic slab subduction to the west and the break-off of the Nujiang-Bitu oceanic slab to the north. The subduction of the Neo-Tethys oceanic plate beneath the Tengchong block from Late Cretaceous to Paleogene formed abundant S-type granitoids and many skarn-type and greisen-type Sn-W deposits. Granitoids formed at 105 to 81 Ma and contemporaneous hydrothermal W, Mo, Ag and Au deposits, which temporally coincided with the subduction of the Neo-Tethys, are common in the Yidun arc terrane. (C) 2013 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Shale gas potential of the major marine shale formations in the Upper Yangtze Platform, South China, Part II: Methane sorption capacity

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摘要: The marine black shale formations on the Upper Yangtze Platform (UYP), South China are exploration targets for shale gas. Here, we report on the methane sorption capacity of thermally overmature samples from the Lower Silurian and Lower Cambrian black shale intervals in the UYP (UYP-samples). Two immature shale samples from the Middle Cambrian formation in the Georgina Basin, North Australia (AU samples) were also tested to investigate the effect of thermal maturity on sorption isotherms. Excess sorption isotherms were performed over a pressure range of 0-25 MPa at 46 degrees C. The effects of TOC content, thermal maturity, clay minerals, moisture content, pore properties, particle size, temperature, and pressure on methane sorption capacity were analysed. In addition, thermovaporisation gas chromatography (Tvap-GC) was used to measure the residual gas that is stored in the samples under atmospheric pressure and temperature conditions.

The results indicate that the maximum methane excess sorption of the Lower Silurian samples is between 0.045 and 0.064 mmol/g rock and that of Lower Cambrian samples is between 0.036 and 0.210 mmol/g rock. The Langmuir sorption capacity of the Lower Silurian samples ranges from 0.096 to 0.115 mmol/g rock, whereas that of the Lower Cambrian shale ranges from 0.077 to 0.310 mmol/g rock. These results are close to the sorption capacities of the Barnett (U.S.), Devonian-Mississippian ( Western Canada), and Alum ( Southern Scandinavia) shale samples. The shape of the sorption isotherms and methane sorption capacity vary from sample to sample. Under the measured pressure range, the isotherms of the selected immature AU Cambrian samples increase monotonously with pressure, whereas the overmature UYP samples exhibit maxima. The methane sorption capacity of the measured samples positively correlates with TOC content and exhibits a distinct linear relation. The TOC-normalised sorption capacity shows a positive correlation with thermal maturity; however, the corresponding pressure of maximum excess sorption and Langmuir pressure decrease substantially with increasing thermal maturity. The clay minerals show a positive effect on the TOC-normalised sorption capacity. The sorption capacity of clay minerals, however, should have been reduced by the moisture content. The two Lower Cambrian samples that have similar maturities were measured for porosity and pore-size distribution. The sample with a high TOC content shows a high total cumulative pore volume, surface area, total porosity and thus a higher sorption capacity than the sample with less TOC. In addition, larger-sized particles show slightly less sorption capacity than smaller-sized particles. The Tvap-GC results show that the residual gas content of core samples is evidently higher than that of the outcrop samples, which implies a remarkably negative effect of the weathering process. (C) 2014 Elsevier Ltd. All rights reserved.

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第 284 条，共 321 条

标题: Influence of Defects on the Photocatalytic Activity of ZnO

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摘要: The influence of defects on the photoactivity of ZnO has been revealed. The defects can be formed via ball-milling treatment, and part of the defects can be repaired via annealing treatment. The photocatalytic activity of the ZnO sharply decreased as the ball-milling speed and milling time increased. After the annealing treatment, the photocatalytic activity recovered partly but could not return to the activity of the pristine ZnO. The bulk defects such as oxygen vacancies (V-O), zinc vacancies (V-Zn) and a lot of nonradiative defects were formed after the milling treatment. The annealing treatment can only repair part of the bulk defects and nonradiative defects. Thus, only part of the photoactivity was recovered. The species trapping experiments showed that the introduction of the bulk defects did not change the photocatalytic mechanism. The main oxidative species for the pristine ZnO, the milled ZnO, and the annealed ZnO are photogenerated holes and hydroxyl radicals.

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第 285 条，共 321 条

标题: Ce and F Comodification on the Crystal Structure and Enhanced Photocatalytic Activity of Bi2WO6 Photocatalyst under Visible Light Irradiation

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摘要: The novel Ce and F codoped Bi2WO6 samples have been successfully obtained by a facile one-step hydrothermal reaction for the first time. They were characterized by X-ray diffraction patterns (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), high-resolution TEM (HRTEM), X-ray photoelectron spectroscopy (XPS), and UV-vis diffuse reflectance spectra (DRS) and photoluminescence (PL) spectra. The presence of Ce3+, Ce4+, and F- dopants in Bi2WO6 was confirmed by XPS. The change of microstructure and optical band gap has also been observed after the doping of Ce and F. Under visible light, the as-synthesized plate-like F-Ce-Bi2WO6 sample exhibits a much better visible-light-responsive photocatalytic performance than pure Bi2WO6 for the degradation of RhB and photocurrent (PC) generation. The mechanism of high photcatalytic activity was also suggested on the basis of the PL spectra, electrochemical impedance spectra (EIS), and active species trapping measurements. The results indicated that the synergistic effect of the Ce and F dopants is responsible for the efficient separation and migration of photoinduced charge carriers, thus resulting in the remarkably improved photocatalytic activity.

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标题: Compositions of chromite, associated minerals, and parental magmas of podiform chromite deposits: The role of slab contamination of asthenospheric melts in suprasubduction zone environments

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来源出版物: GONDWANA RESEARCH 卷: 26 期: 1 特刊: SI 页: 262-283 DOI: 10.1016/j.gr.2013.12.011 出版年: JUL 2014

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摘要: Podiform chromitites in the mantle sections of ophiolites belong to either high-Cr (metallurgical) or high-Al (refractory) varieties. Their highly variable compositions are reflected by different Cr#s [100Cr / (Cr + Al)] and Cr203 and Al2O3 contents of the chromite, falling in the boninitic and MORB fields, respectively. Parental magmas of high-Cr chromitites have higher Sc, Mn, Co and Ni, and lower Ti, V, Zn and Ga concentrations than MORB melts; their trace-element patterns are similar to those of boninites, except for Ni and Zn. In contrast, high-Al chromitites have parental magmas characterized by generally flat MORB-normalized patterns, showing slight enrichments in V, Mn and Co, and depletion in Ni and Zn. Regardless of their compositions, both types of chromitites have chondrite-normalized platinum group element (PGE) patterns showing enrichment in IPGE and depletion in PPGE. A variety of platinum group minerals are typically present in both types, occurring either as euhedral inclusions or along fractures in chromite grains. These minerals have a wide span of Re-Os isotopic compositions, reflecting a variety of origins.

There is a diversity of unusual minerals and mineral inclusions associated with podiform chromitites. The presence of these minerals suggest that grains of amphibolite (plagioclase, amphibole and zircon) and eclogite (coesite, kyanite and garnet) were present in the magmas from which chromite crystallized. Multiphase mineral inclusions demonstrate that podiform chromitites form from hydrous mafic magmas in suprasubduction zone environments (SSZ). We propose a new model in which chromitite formation was involved in intra-oceanic subduction zones initiated in closing oceanic basins. Continued subduction carries oceanic and possibly continental crustal materials to deep levels where they are metamorphosed under greenschist, amphibolite and eclogite facies conditions. The tearing and breakoff of the subducted slab, possibly along the transitional contact between amphibolites and eclogites, create a slab window through which the underlying asthenosphere rises and melts to generate Cr-rich mafic magmas. These upward-migrating magmas pass through the subduction zone and assimilate the subducted slab. As a result of slab contamination, these magmas become more siliceous, more oxidized and more hydrous, rapidly triggering chromite crystallization. Minute grains of chromite are suspended in the upward-moving magmas as they migrate through the overlying metasomatized mantle wedge. Such chromite-bearing magmas eventually deposit chromite in magma conduits in the uppermost mantle close to the Moho where the upward flow changes from vertical to subhorizontal and velocity is greatly reduced.

Highly reduced and ultrahigh pressure minerals including diamonds are reported in literature both in podiform chromitites and host peridotites of ophiolites. Some of these minerals in association with host peridotites may have been brought by the uprising asthenosphere at mid-oceanic ridges due to the mantle convection. It is also possible that some diamonds may have formed in the subducted slab below about 150 km. Some minerals of subducted slabs are preserved because they are encapsulated in chromite grains where they are protected from the SSZ melts. Some of these SSZ mantle wedges are emplaced on land to become podiform chromititebearing ophiolites. (C) 2014 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Generalized Modeling of Spontaneous Imbibition Based on Hagen-Poiseuille Flow in Tortuous Capillaries with Variably Shaped Apertures

作者: Cai, JC (Cai, Jianchao); Perfect, E (Perfect, Edmund); Cheng, CL (Cheng, Chu-Lin); Hu, XY (Hu, Xiangyun)

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摘要: Spontaneous imbibition of wetting liquids in porous media is a ubiquitous natural phenomenon which has received much attention in a wide variety of fields over several decades. Many traditional and recently presented capillary-driven flow models are derived based on Hagen-Poiseuille (H-P) flow in cylindrical capillaries. However, some limitations of these models have motivated modifications by taking into account different geometrical factors. In this work, a more generalized spontaneous imbibition model is developed by considering the different sizes and shapes of pores, the tortuosity of imbibition streamlines in random porous media, and the initial wetting-phase saturation. The interrelationships of accumulated imbibition weight, imbibition rate and gas recovery and the properties of the porous media, wetting liquids, and their interactions are derived analytically. A theoretical analysis and comparison denote that the presented equations can generalize several traditional and newly developed models from the literature. The proposed model was evaluated using previously published data for spontaneous imbibition measured in various natural and engineered materials including different rock types, fibrous materials, and silica glass. The test-results show that the generalized model can be used to characterize the spontaneous imbibition behavior of many different porous media and that pore shape cannot always be assumed to be cylindrical.

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第 288 条，共 321 条

标题: Outward-growth of the Tibetan Plateau during the Cenozoic: A review

作者: Wang, CS (Wang, Chengshan); Dai, JG (Dai, Jingen); Zhao, XX (Zhao, Xixi); Li, YL (Li, Yalin); Graham, SA (Graham, Stephan A.); He, DF (He, Dengfa); Ran, B (Ran, Bo); Meng, J (Meng, Jun)

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摘要: The surface uplift history of the Tibetan Plateau (TP) offers a key testing ground for evaluating models of collisional tectonics and holds important implications for processes ranging from global cooling to the onset of the Asian monsoon. Various models have been proposed to reveal the surface uplift history of the TP, but controversies remain. We evaluate these models using data from sedimentology and stratigraphy, structural geology, magmatism, exhumation, and paleoaltimetry studies. Structural analyses indicate that thrust belts, which spread from the central TP outward toward its surrounding margins, accommodated most of the India-Asia convergence, and facilitated crustal shortening and thickening in the central TP. Eocene adakitic rocks located in the Qiangtang and the Lhasa blocks likely were generated by partial melting of an eclogitic source. Paleogene (50-30 Ma) potassic rocks only occur in the Qiangtang block, whereas Late Oligocene-Late Miocene (26-8 Ma) potassic rocks occur both in the Qiangtang and Lhasa blocks. Low-temperature thermochronologic ages in the central TP are older than 40-35 Ma, whereas those in the margins are younger than 20 Ma (mostly Late Miocene, and Pliocene/Pleistocene in age). Independent paleoaltimetry estimates suggest that the Lhasa and Qiangtang terranes attained their current elevations during the Eocene, most likely due to the initial collision between India and Lhasa, whereas the Hoh Xil basin area to the north and Himalayas to the south were still low, even below sea level in the latter case. We argue for an inside-out growth pattern for the Tibetan Plateau. The TP grew southward and northward from a nucleus of high topography and is likely to continue expanding along the Mazar Tagh fault to the northwest, the Kuantai Shan-Hei Shan-Longshou Shan to the northeast, the Longquan Shan to the east and the Shillong plateau to the south if the northward force of India would not diminished. (C) 2014 Elsevier B.V. All rights reserved.

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标题: The western Central Asian Orogenic Belt: A window to accretionary orogenesis and continental growth

作者: Xiao, WJ (Xiao, Wenjiao); Santosh, M (Santosh, M.)

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摘要: The architecture of accretionary orogens is a key to understand continental growth. Here we present an overview of the orogenic components and their amalgamation in the western Central Asian Orogenic Belt (CAOB). The CAOB records the convergence and interactions among various types of orogenic components including the Japan-type, Mariana-type, and Alaska-Aleutian-type arc systems, as well as the active marginal sequences of the Siberia Craton, which incorporated wide accretionary complexes and accreted arcs and terranes. During construction of the CAOB, the Kazakhstan arc chain was characterized by multiple subduction, whereas the northern fringe of the Tarim Craton remained mostly as a passive margin. The multiple convergence and accretions among these various orogenic components generated huge orogenic collages in the late Paleozoic and even in the early Triassic, involving parallel amalgamation, circum-microcontinent amalgamation and oroclinal bending. The preservation of trapped basins played a significant role in orogenesis with some parts of the oceanic plate being subducted and others behaving as rigid units. The orogenesis in the CAOB was long-lived, lasting for more than 800 m.y., involving multiple-subduction and long, continuous accretion, and featuring the complexity of accretionary orogenesis and continent growth. (C) 2014 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 290 条，共 321 条

标题: Constructing a Novel No-Equilibrium Chaotic System

作者: Pham, VT (Viet-Thanh Pham); Volos, C (Volos, Christos); Jafari, S (Jafari, Sajad); Wei, ZC (Wei, Zhouchao); Wang, X (Wang, Xiong)

来源出版物: INTERNATIONAL JOURNAL OF BIFURCATION AND CHAOS 卷: 24 期: 5 文献号: 1450073 DOI: 10.1142/S0218127414500734 出版年: MAY 2014

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摘要: This paper introduces a new no-equilibrium chaotic system that is constructed by adding a tiny perturbation to a simple chaotic flow having a line equilibrium. The dynamics of the proposed system are investigated through Lyapunov exponents, bifurcation diagram, Poincare map and period-doubling route to chaos. A circuit realization is also represented. Moreover, two other new chaotic systems without equilibria are also proposed by applying the presented methodology.

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第 291 条，共 321 条

标题: The dilemma of the Jiaodong gold deposits: Are they unique?

作者: Goldfarb, RJ (Goldfarb, Richard J.); Santosh, M (Santosh, M.)

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摘要: The ca. 126-120 Ma Au deposits of the Jiaodong Peninsula, eastern China, define the country's largest gold province with an overall endowment estimated as >3000 t Au. The vein and disseminated ores are hosted by NE- to NNE-trending brittle normal faults that parallel the margins of ca. 165-150 Ma, deeply emplaced, lower crustal melt granites. The deposits are sited along the faults for many tens of kilometers and the larger orebodies are associated with dilatational jogs. Country rocks to the granites are Precambrian high-grade metamorphic rocks located on both sides of a Triassic suture between the North and South China blocks. During early Mesozoic convergent deformation, the ore-hosting structures developed as ductile thrust faults that were subsequently reactivated during Early Cretaceous "Yanshanian" intracontinental extensional deformation and associated gold formation.

Classification of the gold deposits remains problematic. Many features resemble those typical of orogenic Au including the linear structural distribution of the deposits, mineralization style, ore and alteration assemblages, and ore fluid chemistry. However, Phanerozoic orogenic Au deposits are formed by prograde metamorphism of accreted oceanic rocks in Cordilleran-style orogens. The Jiaodong deposits, in contrast, formed within two Precambrian blocks approximately 2 billion years after devolatilization of the country rocks, and thus require a model that involves alternative fluid and metal sources for the ores. A widespread suite of ca. 130-123 Ma granodiorites overlaps temporally with the ores, but shows a poor spatial association with the deposits. Furthermore, the deposit distribution and mineralization style is atypical of ores formed from nearby magmas. The ore concentration requires fluid focusing during some type of sub-crustal thermal event, which could be broadly related to a combination of coeval lithospheric thinning, asthenospheric upwelling, paleo-Pacific plate subduction, and seismicity along the continental-scale Tan-Lu fault. Possible ore genesis scenarios include those where ore fluids were produced directly by the metamorphism of oceanic lithosphere and overlying sediment on the subducting paleo-Pacific slab, or by devolatilization of an enriched mantle wedge above the slab. Both the sulfur and gold could be sourced from either the oceanic sediments or the serpentinized mantle. A better understanding of the architecture of the paleo-Pacific slab during Early Cretaceous below the eastern margin of China is essential to determination of the validity of possible models. (C) 2013, China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V. All rights reserved.

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标题: 3.45 Ga granitic gneisses from the Yangtze Craton, South China: Implications for Early Archean crustal growth

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摘要: Zircon U-Pb-Lu-Hf-O isotopic compositions of two granitic gneisses from the Kongling Terrain in the Yangtze Craton, South China were determined by SIMS, LA-ICP-MS and LA-MC-ICP-MS. Whole rocks of the two samples were analyzed for major and trace element compositions. The SIMS and LA-ICP-MS data reveal similar five zircon age groups of 3.4, 3.3, 2.9, 2.7, and 2.0 Ga for both gneisses. Three groups (magmatic Group A, metamorphic Group B, and overgrowth Group C) of the 3.4 Ga zircons were identified based on their CL images. These three groups have indistinguishable ages and Th/U ratios. Groups A and B show identical Hf-176/Hf-177 (t), although Group C was too thin to be analyzed by LA-ICP-MS. Taken together, zircons from the two samples with 98-102% age concordance give weighted average SIMS ages of 3434.3 +/- 9.6 Ma (2o-, MSWD = 13, n =8) for Group A, 3446.0 +/- 8.8 Ma (2a, MSWD = 10.7, 11 = 15) for Group B, and 3479 +/- 26 Ma (2o-,1VISWD = 0.49, n = 2) for Group C. Groups A and B together yield an upper intercept age of 3457 +/- 14 Ma (2o-, MSWD = 0.85, n=23). The LA-ICP-MS data yield weighted average ages of 3442 +/- 19 Ma (2a, MSWD =0.17, n = 7) for Group A and 3435 +/- 11 Ma (2a, MSWD = 0.44, n = 16) for Group B. They yield an upper intercept age of 3443 +/- 13 Ma (2 sigma, MSWD = 0.63, n = 23). These SIMS and LA-ICP-MS ages are consistent. We propose that the above SIMS and LA-ICP-MS ages of Groups A and B are the best estimates of the granitic magmatism and the subsequent metamorphism. The metamorphism must have occurred after the granitic magmatism within a few tens of million years, as constrained by their age errors. Accordingly, these two granitic gneisses represent the oldest rocks currently known in South China. They predate the previously reported 3300-Ma-old trondhjemitic gneiss from the Kongling Terrain by 150 Ma.

The 3.4 Ga zircons show near chondritic sElf (t) (-0.7 1.0, 2a, MSWD = 1.14, n =8), which is below the coeval value of the depleted mantle. This suggests that the granitic magma contained materials of preexisting continental crust. Their higher-than-mantle 8180 values (6.1-6.4%) imply that such materials must have been interacted with surface water. Crust formation ages (TDDA2) of the 3.4 Ga zircons vary from 3.9 to 3.6 Ga with a weighted average of 3703 27 Ma (2a, MSWD = 1.05, n = 7). Our results support previous studies that the Yangtze Craton may have contained the continental crust as old as 3.8 Ga.

Among the younger age groups, the 3.3 Ga zircons exhibit Hf-176/Hf-177 (t) and delta O-18 values similar to the 3.4 Ga zircons, suggesting that they were altered from the 3.4 Ga zircons. The 2.9 and 2.7 Ga zircons in both samples are rare and magmatic. Their Hf-176/Hf-177 (t) ratios are distinct from the 3.4 Ga zircons, indicating different sources. These two age groups are consistent with the 2.9 Ga trondhjemitic-tonalitic-granodioritic and the 2.7 Ga A-type granitic magmatism in the Kongling Terrain. The 2.0 Ga metamorphic zircons, regardless of being concordant or discordant, have Hf-176/Hf-177 (t) ratios overlapping those of the 2.7 Ga zircons, suggesting a common source. In contrast, delta O-18 of the 2.0 Ga zircons is strongly variable and positively correlated with age concordance. The low delta O-18 (down to 3.1%.) requires interaction with hydrothermal fluid. These results suggest that at least some of the 2.0 Ga zircons were likely to have been altered from the 2.7 Ga zircons by hydrothermal fluid. (C) 2014 Elsevier B.V. All rights reserved.

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第 293 条，共 321 条

标题: A review of high arsenic groundwater in Mainland and Taiwan, China: Distribution, characteristics and geochemical processes

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摘要: China is a typical high-As region, where 20 provinces have high As groundwaters among 34 provinces. These groundwaters usually occur in both arid-semiarid inland basins and river deltas. In the inland basins, mainly distributed in the northwest of China, shallow groundwaters usually have high As concentrations in alluvial lacustrine or lacustrine sediment aquifers, while high As groundwater mainly occurs in fluvial-marine sedimentary aquifers in the river deltas, which have been affected by transgression. In both the inland basins and the river deltas, high As groundwaters, mainly occurring in reducing conditions, are characterized by high Fe and Mn concentrations, high pH and HCO3- concentration, and relatively low NO3 and SO24 concentrations. Although As contents are well correlated to Fe/Mn contents in the aquifer sediments, groundwater As concentrations are generally independent of sediment As contents. Redox processes, microbe-related reduction, and desorption processes are the major geochemical processes for As enrichment in groundwaters. In reducing conditions, both reductive dissolution of Fe oxides and reductive desorption of As are believed to result in As mobilization, which would be catalyzed by indigenous microbes. Although decomposition of the low-molecular weight organic matter during microbe metabolization would also release the colloid-bound As into groundwater, the cycling of colloidal As still needs to be further investigated during redox processes. Besides, high pH and high HCO3- lead to As desorption from adsorption sites in the aquifer systems. However, the contribution of competitive desorption to high As concentrations is still unknown and remains to be discovered, relative to reductive dissolution of Fe oxides, especially in the inland basins. (C) 2014 Elsevier Ltd. All rights reserved.

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第 294 条，共 321 条

标题: Continental orogenesis from ocean subduction, continent collision/subduction, to orogen collapse, and orogen recycling: The example of the North Qaidam UHPM belt, NW China

作者: Song, SG (Song, Shuguang); Niu, YL (Niu, Yaoling); Su, L (Su, Li); Zhang, C (Zhang, Cong); Zhang, LF (Zhang, Lifei)

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摘要: The North Qaidam ultra-high pressure metamorphic (UHPM) belt in the northern Tibetan Plateau records a complete history of the evolution of a continental orogen from prior seafloor subduction, to continental collision and subduction, and to the ultimate orogen collapse in the time period from the Neoproterozoic to the Paleozoic. Lithologies in this UHPM belt consist predominantly of felsicgneisses containing blocks of edogite and peridotite. The 1120-900 Ma granitic and psammitic/pelitic gneisses compose the majority of the UHPM belt and is genetically associated with the previous orogenic cycle of Grenville-age, whereas protoliths of the HUPM eclogites are of both the 850-820 Ma continental flood basalts (CFBs) and the 540-500 Ma oceanic crust (ophiolite). The early stage of quartz-stable eclogite-facies metamorphism took place at -445-473 Ma, the same age as that of the HP rocks in the North Qilian oceanic suture zone, representing the earliest subducting seafloor rocks exhumed and preserved. Coesite-bearing zircons from the metapelite and eclogite, diamond-bearing zircons from garnet peridotites constrain the UHP metamorphic age of -438-420 Ma, which represents the timing of continental subduction at depths of 100-200 km, -10-20 m.y. younger than the early stage of the (lian seafloor subduction. Therefore, deep subduction of continental crust should be the continuation of oceanic subduction that is pulled down by the sinking oceanic lithosphere or pushed down by the overriding upper plate, which is an expected and inevitable consequence for the scenario of passive continental margins. Partial melting of subducted ocean crust might occur in response to continental subduction at -435 Ma.

The UHPM rocks started to exhume accompanied by mountain building and deposition of Early Devonian molasses in the North Qilian region at -420 Ma. Decoupling of oceanic subduction zone and continent UHPM terranes may be attributed to the different exhumation path and mechanism between the subducted oceanic and continent crusts, or rollback of subduction zone. Decompression melting of UHP metamorphosed slab and continental crust during exhumation is responsible for the generation of adaldtic melts and S-type granite. Mountain collapse and lithosphere extension happened in the period of -400-360 Ma and formed diorite-granite intrusions in the UHPM belt, which marked the end of a complete orogenic cycle.

This UHP metamorphic belt presents an example of multi-epoch tectonic recycles, represented by recombination of the Neoproterozoic Grenvillian orogenesis and the Early Paleozoic Caledonian orogenesis. (C) 2013 Elsevier B.V. All rights reserved.

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第 295 条，共 321 条

标题: The supercontinent cycle: A retrospective essay

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摘要: The recognition that Earth history has been punctuated by supercontinents, the assembly and breakup of which have profoundly influenced the evolution of the geosphere, hydrosphere, atmosphere and biosphere, is arguably the most important development in Earth Science since the advent of plate tectonics. But whereas the widespread recognition of the importance of supercontinents is quite recent, the concept of a supercontinent cycle is not new and advocacy of episodicity in tectonic processes predates plate tectonics. In order to give current deliberations on the supercontinent cycle some historical perspective, we trace the development of ideas concerning long-term episodicity in tectonic processes from early views on episodic orogeny and continental crust formation, such as those embodied in the chelogenic cycle, through the first realization that such episodicity was the manifestation of the cyclic assembly and breakup of supercontinents, to the surge in interest in supercontinent reconstructions. We then chronicle some of the key contributions that led to the cycle's widespread recognition and the rapidly expanding developments of the past ten years. (C) 2013 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Phanerozoic continental growth and gold metallogeny of Asia

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摘要: The Asian continent formed during the past 800 m.y. during late Neoproterozoic through Jurassic closure of the Tethyan ocean basins, followed by late Mesozoic circum-Pacific and Cenozoic Himalayan orogenies. The oldest gold deposits in Asia reflect accretionary events along the margins of the Siberia, Kazakhstan, North China, Tarim-Karakum, South China, and Indochina Precambrian blocks while they were isolated within the Paleotethys and surrounding Panthalassa Oceans. Orogenic gold deposits are associated with large-scale, terrane-bounding fault systems and broad areas of deformation that existed along many of the active margins of the Precambrian blocks. Deposits typically formed during regional transpressional to transtensional events immediately after to as much as 100 m.y. subsequent to the onset of accretion or collision. Major orogenic gold provinces associated with this growth of the Asian continental mass include: (1) the ca. 750 Ma Yenisei Ridge, ca. 500 Ma East Sayan, and ca. 450-350 Ma Patom provinces along the southern margins of the Siberia craton; (2) the 450 Ma Charsk belt of north-central Kazakhstan; (3) the 310-280 Ma Kalba belt of NE Kazakhstan, extending into adjacent NW Xinjiang, along the Siberia-Kazakhstan suture; (4) the ca. 300-280 Ma deposits within the Central Asian southern and middle Tien Shan (e.g., Kumtor, Zarmitan, Muruntau), marking the closure of the Turkestan Ocean between Kazakhstan and the Tarim-Karalcum block; (5) the ca. 190-125 Ma Transbaikal deposits along the site of Permian to Late Jurassic diachronous closure of the Mongol-Okhotsk Ocean between Siberia and Mongolia/North China; (6) the probable Late Silurian-Early Devonian Jiagnan belt formed along the margin of Gondwana at the site of collision between the Yangtze and Cathaysia blocks; (7) Triassic deposits of the Paleozoic Qilian Shan and West Qinling orogens along the SW margin of the North China block developed during collision of South China; and (8) Jurassic(?) ores on the margins of the Subumusu block in Myanmar and Malaysia. Circum-Pacific tectonism led to major orogenic gold province formation along the length of the eastern side of Asia between ca. 135 and 120 Ma, although such deposits are slightly older in South Korea and slightly younger in the Amur region of the Russian Southeast. Deformation related to collision of the Kolyma-Omolon microcontinent with the Pacific margin of the Siberia craton led to formation of 136-125 Ma ores of the Yana-Kolyma belt (Natalka, Sarylakh) and 125-119 Ma ores of the South Verkhoyansk synclinorium (Nezhdaninskoe). Giant ca. 125 Ma gold provinces developed in the late Archean uplifted basement of the decratonized North China block, within its NE edge and into adjacent North Korea, in the Jiaodong Peninsula, and in the Qinling Mountains. The oldest gold-bearing magmatic-hydrothermal deposits of Asia include the ca. 485 Ma Duobaoshan porphyry within a part of the Tuva-Mongol arc, ca. 355 Ma low-sulfidation epithermal deposits (Kubaka) of the Omolon terrane accreted to eastern Russia, and porphyries (Bozshakol, Taldy Bulak) within Ordovican to Early Devonian oceanic arcs formed off the Kazakhstan microcontinent The Late Devonian to Carboniferous was marked by widespread gold-rich porphyry development along the margins of the closing Ob-Zaisan, Junggar-Balkhash, and Turkestan basins (Amalyk, Oyu Tolgoi); most were formed in continental arcs, although the giant Oyu Tolgoi porphyry was part of a near-shore oceanic arc.

Permian subduction-related deformation along the east side of the Indochina block led to ca. 300 Ma gold-bearing skarn and disseminated gold ore formation in the Truong Son fold belt of Laos, and along the west side to ca. 250 Ma gold-bearing skarns and epithermal deposits in the Loei fold belt of Laos and Thailand. In the Mesozoic Transbaikal region, extension along the basin margins subsequent to Mongol-Okhotsk closure was associated with ca. 150-125 Ma formation of important auriferous epithermal (Balei), skarn (Bystray), and porphyry (Kultuminskoe) deposits. In northeastern Russia, Early Cretaceous Pacific margin subduction and Late Cretaceous extension were associated with epithermal gold-deposit formation in the Uda-Murgal (Julietta) and Okhotsk-Chukotka (Dukat, Kupol) volcanic belts, respectively. In southeastern Russia, latest Cretaceous to Oligocene extension correlates with other low-sulfidation epithermal ores that formed in the East Sikhote-Alin volcanic belt. Other extensional events, likely related to changing plate dynamics along the Pacific margin of Asia, relate to epithermal-skarn-porphyry districts that formed at ca. 125-85 Ma in northeastmost China and ca. 105-90 Ma in the Coast Volcanic belt of SE China. The onset of strike slip along a part of the southeastern Pacific margin appears to correlate with the giant 148-135 Ma gold-rich porphyry-skarn province of the lower and middle Yangtze River. It is still controversial as to whether true Carlin-like gold deposits exist in Asia. Those deposits that most closely resemble the Nevada (USA) ores are those in the Permo-Triassic Youjiang basin of SW China and NE Vietnam, and are probably Late Triassic in age, although this is not certain. Other Carlin-like deposits have been suggested to exist in the Sepon basin of Laos and in the Mongol-Okhotsk region (Kuranakh) of Transbaikal. Published by Elsevier B.V. on behalf of International Association for Gondwana Research.

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标题: Accretionary complexes in the Asia-Pacific region: Tracing archives of ocean plate stratigraphy and tracking mantle plumes

作者: Safonova, IY (Safonova, I. Yu); Santosh, M (Santosh, M.)

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摘要: The accretionary complexes of Central and East Asia (Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Mongolia, and China) and the Western Pacific (China, Japan, Russia) preserve valuable records of ocean plate stratigraphy (UPS). From a comprehensive synthesis of the nature of occurrence, geochemical characteristics and geochronological features of the oceanic island basalts (OM) and ophiolite units in the complexes, we track extensive plume-related magmatism in the Paleo-Asian and Paleo-Pacific Oceans. We address the question of continuous versus episodic intraplate magmatism and its contribution to continental growth. An evaluation of the processes of subduction erosion and accretion illustrates continental growth at the active margins of the Siberian, Kazakhstan, Tarim and North China blocks, the collision of which led to the construction of the Central Asian Orogenic Belt (CAOB). Most of the OIB-bearing UPS units of the CAOB and the Western Pacific formed in relation to two superplumes: the Asian (late Neoproterozoic) and the Pacific (Cretaceous), with a continuing hot mantle upwelling in the Pacific region that contributes to the formation of modern OIBs. Our study provides further insights into the processes of continental construction because the accreted seamounts play an important role in the growth of convergent margins and enhance the accumulation of fore-arc sediments. (C) 2012 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Metallogeny and craton destruction: Records from the North China Craton

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摘要: The link between metallogeny and craton destruction in the North China Craton (NCC) remains poorly understood, particularly the mechanisms within the interior of the craton. In this overview, we summarize the major stages in the history of formation and evolution of the NCC, the spatio-temporal distribution and types of major ore species, as well as mantle contribution to the metallogeny, in an attempt to evaluate the geodynamic settings of metallogeny and the mechanisms of formation of the ore deposits. The early Precambrian history of the NCC witnessed the amalgamation of micro-blocks and construction of the fundamental tectonic architecture of the craton by 2.5 Ga. The boundaries of these micro-blocks and the margins of the NCC remained as weak zones and were the principal locales along which inhomogeneous destruction of the craton occurred during later tectonothermal events. These zones record the formation of orogeny related gold, copper, iron and titanium during the early to middle Paleoproterozoic with ages ranging from 2.5 to 1.8 Ma. The Early Ordovician kimberlite and diamond mineralization at ca. 480 Ma, the Late Carboniferous and Early to middle Permian calc-alkaline, I-type granitoids and gold deposits of 324-300 Ma, and the Triassic alkaline rocks and gold silver-polymetallic deposits occurring along these zones and the margins of the blocks correlate with rising mantle plume, southward subduction of the Siberian plate and northward subduction of the Yangtze plate, respectively. The voluminous Jurassic granitoids and Cretaceous intrusives carrying gold, molybdenum, copper, lead and zinc deposits are also localized along the weak zones and block margins. The concentration of most of these deposits in the eastern part of the NCC invokes correlation with lithosphere thinning associated with the westward subduction of the Pacific plate. Although magmatism and mineralization have been recorded along the margins and few places within the interior of the NCC in the Jurassic, their peak occurred in the Cretaceous in the eastern part of the NCC, marking large scale destruction of the craton at this time. The junctions of the boundaries between the micro-continental blocks are characterized by extensive inhomogeneous thinning. We propose that these junctions are probably for future mineral exploration targeting in the NCC. (C) 2013 Elsevier B.V. All rights reserved.

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第 299 条，共 321 条

标题: Qinghu zircon: A working reference for microbeam analysis of U-Pb age and Hf and O isotopes

作者: Li, XH (Li XianHua); Tang, GQ (Tang GuoQiang); Gong, B (Gong Bing); Yang, YH (Yang YueHeng); Hou, KJ (Hou KeJun); Hu, ZC (Hu ZhaoChu); Li, QL (Li QiuLi); Liu, Y (Liu Yu); Li, WX (Li WuXian)

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摘要: Zircon is the most useful mineral for studies in U-Pb geochronology and Hf and O isotope geochemistry. Matrix effect is a major problem of the microbeam techniques such as SIMS and LA-(MC)-ICPMS. Therefore, external standardization using well-characterized natural zircon standards is fundamental for accurate microbeam measurements. While the isotopic geochronology and geochemistry laboratories equipped with microbeam analytical facilities have been increasingly established in China during the past decade, applications of the isotopic microanalysis are still limited due to shortage of available standards. We report here the Qinghu zircon as a potential new working reference for microbeam analysis of zircon U-Pb age and O-Hf isotopes. This zircon was separated from the Qinghu quartz monzonite from the western Nanling Range, Southeast China. It is fairly homogeneous in U-Pb age and Hf and O isotopes in terms of large amounts of mircobeam measurements by LA-MC-ICPMS and SIMS at the scales of 20-60 mu m. SIMS measurements yield consistent Pb-206/U-238 age within analytical uncertainties with that obtained by ID-TIMS. Precise determinations of O isotopes by IRMS and Hf isotopes by solution MC-ICPMS are in good agreement with the statistical mean of microbeam measurements. We recommend U-Pb age of = 159.5 +/- 0.2 Ma (2SE), delta O-18 = 5.4aEuro degrees +/- 0.2aEuro degrees (2SD) and Hf-176/Hf-177 = 0.283002 +/- 0.000004 (2SD) as the best reference values for the Qinghu zircon.

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第 300 条，共 321 条

标题: Differential Evolution With Ranking-Based Mutation Operators

作者: Gong, WY (Gong, Wenyin); Cai, ZH (Cai, Zhihua)

来源出版物: IEEE TRANSACTIONS ON CYBERNETICS 卷: 43 期: 6 页: 2066-2081 DOI: 10.1109/TCYB.2013.2239988 出版年: DEC 2013

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摘要: Differential evolution (DE) has been proven to be one of the most powerful global numerical optimization algorithms in the evolutionary algorithm family. The core operator of DE is the differential mutation operator. Generally, the parents in the mutation operator are randomly chosen from the current population. In nature, good species always contain good information, and hence, they have more chance to be utilized to guide other species. Inspired by this phenomenon, in this paper, we propose the ranking-based mutation operators for the DE algorithm, where some of the parents in the mutation operators are proportionally selected according to their rankings in the current population. The higher ranking a parent obtains, the more opportunity it will be selected. In order to evaluate the influence of our proposed ranking-based mutation operators on DE, our approach is compared with the jDE algorithm, which is a highly competitive DE variant with self-adaptive parameters, with different mutation operators. In addition, the proposed ranking-based mutation operators are also integrated into other advanced DE variants to verify the effect on them. Experimental results indicate that our proposed ranking-based mutation operators are able to enhance the performance of the original DE algorithm and the advanced DE algorithms.

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第 301 条，共 321 条

标题: Two Novel Bi-Based Borate Photocatalysts: Crystal Structure, Electronic Structure, Photoelectrochemical Properties, and Photocatalytic Activity under Simulated Solar Light Irradiation

作者: Huang, HW (Huang, Hongwei); He, Y (He, Ying); Lin, ZS (Lin, Zheshuai); Kang, L (Kang, Lei); Zhang, YH (Zhang, Yihe)

来源出版物: JOURNAL OF PHYSICAL CHEMISTRY C 卷: 117 期: 44 页: 22986-22994 DOI: 10.1021/jp4084184 出版年: NOV 7 2013

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摘要: Through the combination of Bi3+ and a large negative charge ion (BO3)(3-), two novel Bi-based borate photocatalysts Bi4B2O9 and Bi2O2[BO2(OH)] with layered structure have been successfully developed. For the first time, the borates were investigated as photocatalysts. They were synthesized by solid-state reaction and hydrothermal method, respectively, and further characterized by XRD, SEM, TEM, HRTEM, and DRS. Bi4B2O9 and Bi2O2[BO2(OH)] possess direct and indirect transition optical band gaps of 3.02 and 2.85 eV, respectively. Density functional calculations revealed that the valence band (VB) and conduction band (CB) of both borates were composed of hybridized states of the O 2p and Bi 6p or 6s orbitals, and a large dispersion was observed in the energy band of Bi2O2[BO2(OH)]. The photodecomposition experiments demonstrated that Bi4B2O9 and Bi2O2[BO2(OH)] can be used as effective photocatalysts under simulated solar irradiation, and Bi2O2[BO2(OH)] exhibits the high photocatalytic activity, which is 2.5 and 3.2 times compared with that of P25 and Bi2O2CO3, respectively. Moreover, the photocurrent conversion further confirmed that Bi4B2O9 and Bi2O2[BO2(OH)] were potential photofunctional materials. The layered structure with (Bi2O2)(2+) layer, hybridized and dispersion energy band, and large negative charge of (BO3)(3-) ion should be responsible for the high photocatalytic activity of Bi2O2[BO2(OH)].

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第 302 条，共 321 条

标题: Tectonics of South China continent and its implications

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来源出版物: SCIENCE CHINA-EARTH SCIENCES 卷: 56 期: 11 页: 1804-1828 DOI: 10.1007/s11430-013-4679-1 出版年: NOV 2013

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摘要: This paper aims at exploring the tectonic characteristics of the South China Continent (SCC) and extracting the universal tectonic rules from these characteristics, to help enrich the plate tectonic theory and better understand the continental dynamic system. For this purpose, here we conduct a multi-disciplinary investigation and combine it with the previous studies to reassess the tectonics and evolution of SCC and propose that the tectonic framework of the continent comprises two blocks, three types of tectonic units, four deformation systems, and four evolutionary stages with distinctive mechanism and tectonic characteristics since the Neoproterozoic. The four evolutionary stages are: (1) The amalgamation and break-up of the Neoproterozoic plates, typically the intracontinental rifting. (2) The early Paleozoic and Mesozoic intracontinental orogeny confined by plate tectonics, forming two composite tectonic domains. (3) The parallel operation of the Yangtze cratonization and intracontinental orogeny, and multi-phase reactivation of the Yangtze craton. (4) The association and differentiation evolution of plate tectonics and intracontinental tectonics, and the dynamic characteristics under the Meso-Cenozoic modern global plate tectonic regime.

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第 303 条，共 321 条

标题: Structural and Luminescence Properties of Yellow-Emitting NaScSi2O6:Eu2+ Phosphors: Eu2+ Site Preference Analysis and Generation of Red Emission by Codoping Mn2+ for White-Light-Emitting Diode Applications

作者: Xia, ZG (Xia, Zhiguo); Zhang, YY (Zhang, Yuanyuan); Molokeev, MS (Molokeev, Maxim S.); Atuchin, VV (Atuchin, Victor V.)

来源出版物: JOURNAL OF PHYSICAL CHEMISTRY C 卷: 117 期: 40 页: 20847-20854 DOI: 10.1021/jp4062225 出版年: OCT 10 2013

Web of Science 核心合集中的 "被引频次": 346

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摘要: The structural properties of clinopyroxene NaScSi2O6 have been investigated using the X-ray powder diffraction refinement, and the luminescence properties of Eu2+ and Eu2+/Mer-activated NaScSi2O6 have been studied to explore the new materials for phosphor-converted white light ultraviolet light-emitting diodes (UV-LEDs). Eu2+ was introduced into the NaScSi2O6 host in the reducing atmosphere, and the preferred crystallographic positions of the Eu2+ ions were determined based on the different structural models of the NaScSi2O6 host. The as-obtained NaScSi2O6:Eu2+ phosphor shows greenish yellow emission with the broad-band peak at 533 nm, and efficient energy transfer (ET) takes place between Eu2+ and Mn2+ in NaScSi2O6, leading to a series of color-tunable phosphors emitting at 533 and 654 nm for the designed NaScSi2O6:Eu2+,Mn2+ phosphors under excitation at 365 nm. The ET mechanism of Eu2+ and Mn2+ has also been evaluated. We have demonstrated that NaScSi2O6:Eu2+ and NaScSi2O6:Eu2+,Mn2+ materials exhibit great potential to act as the effective phosphors for UV-LEDs.

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第 304 条，共 321 条

标题: Orogen styles in the East African Orogen: A review of the Neoproterozoic to Cambrian tectonic evolution

作者: Fritz, H (Fritz, H.); Abdelsalam, M (Abdelsalam, M.); Ali, KA (Ali, K. A.); Bingen, B (Bingen, B.); Collins, AS (Collins, A. S.); Fowler, AR (Fowler, A. R.); Ghebreab, W (Ghebreab, W.); Hauzenberger, CA (Hauzenberger, C. A.); Johnson, PR (Johnson, P. R.); Kusky, TM (Kusky, T. M.); Macey, P (Macey, P.); Muhongo, S (Muhongo, S.); Stern, RJ (Stern, R. J.); Viola, G (Viola, G.)

来源出版物: JOURNAL OF AFRICAN EARTH SCIENCES 卷: 86 页: 65-106 DOI: 10.1016/j.jafrearsci.2013.06.004 出版年: OCT 2013

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摘要: The East African Orogen, extending from southern Israel, Sinai and Jordan in the north to Mozambique and Madagascar in the south, is the worlds largest Neoproterozoic to Cambrian orogenic complex. It comprises a collage of individual oceanic domains and continental fragments between the Archean Sahara-Congo-Kalahari Cratons in the west and Neoproterozoic India in the east. Orogen consolidation was achieved during distinct phases of orogeny between similar to 850 and 550 Ma. The northern part of the orogen, the Arabian-Nubian Shield, is predominantly juvenile Neoproterozoic crust that formed in and adjacent to the Mozambique Ocean. The ocean closed during a protracted period of island-arc and microcontinent accretion between similar to 850 and 620 Ma. To the south of the Arabian Nubian Shield, the Eastern Granulite-Cabo Delgado Nappe Complex of southern Kenya, Tanzania and Mozambique was an extended crust that formed adjacent to theMozambique Ocean and experienced a similar to 650-620 Ma granulite-facies metamorphism. Completion of the nappe assembly around 620 Ma is defined as the East African Orogeny and was related to closure of the Mozambique Ocean. Oceans persisted after 620 Ma between East Antarctica, India, southern parts of the Congo-Tanzania-Bangweulu Cratons and the Zimbabwe-Kalahari Craton. They closed during the similar to 600-500 Ma Kuungan or Malagasy Orogeny, a tectonothermal event that affected large portions of southern Tanzania, Zambia, Malawi, Mozambique, Madagascar and Antarctica. The East African and Kuungan Orogenies were followed by phases of post-orogenic extension. Early similar to 600-550 Ma extension is recorded in the Arabian-Nubian Shield and the Eastern Granulite-Cabo Delgado Nappe Complex. Later similar to 550-480 Ma extension affected Mozambique and southern Madagascar. Both extension phases, although diachronous,are interpreted as the result of lithospheric delamination. Along the strike of the East African Orogen, different geodynamic settings resulted in the evolution of distinctly different orogen styles. The Arabian-Nubian Shield is an accretion-type orogen comprising a stack of thin-skinned nappes resulting from the oblique convergence of bounding plates. The Eastern Granulite-Cabo Delgado Nappe Complex is interpreted as a hot- to ultra-hot orogen that evolved from a formerly extended crust. Low viscosity lower crust resisted one-sided subduction, instead a sagduction-type orogen developed. The regions of Tanzania and Madagascar affected by the Kuungan Orogeny are considered a Himalayan-type orogen composed of partly doubly thickened crust. (C) 2013 The Authors. Published by Elsevier Ltd. All rights reserved.

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第 305 条，共 321 条

标题: Spatial-temporal relationships of Mesozoic volcanic rocks in NE China: Constraints on tectonic overprinting and transformations between multiple tectonic regimes

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摘要: LA-ICP-MS zircon U-Pb ages and geochemical data are presented for the Mesozoic volcanic rocks in northeast China, with the aim of determining the tectonic settings of the volcanism and constraining the timing of the overprinting and transformations between the Paleo-Asian Ocean, Mongol-Okhotsk, and circum-Pacific tectonic regimes. The new ages, together with other available age data from the literature, indicate that Mesozoic volcanism in NE China can be subdivided into six episodes: Late Triassic (228-201 Ma), Early-Middle Jurassic (190-173 Ma), Middle-Late Jurassic (166-155 Ma), early Early Cretaceous (145-138 Ma), late Early Cretaceous (133-106 Ma), and Late Cretaceous (97-88 Ma). The Late Triassic volcanic rocks occur in the Lesser Xing'an-Zhangguangcai Ranges, where the volcanic rocks are bimodal, and in the eastern Heilongjiang-Jilin provinces where the volcanics are A-type rhyolites, implying that they formed in an extensional environment after the final closure of the Paleo-Asian Ocean. The Early-Middle Jurassic (190-173 Ma) volcanic rocks, both in the Erguna Massif and the eastern Heilongjiang-Jilin provinces, belong chemically to the calc-alkaline series, implying an active continental margin setting. The volcanics in the Erguna Massif are related to the subduction of the Mongol-Okhotsk oceanic plate beneath the Massif, and those in the eastern Jilin-Heilongjiang provinces are related to the subduction of the Paleo-Pacific Plate beneath the Eurasian continent. The coeval bimodal volcanic rocks in the Lesser Xing'an-Zhangguangcai Ranges were probably formed under an extensional environment similar to a backarc setting of double-direction subduction. Volcanic rocks of Middle-Late Jurassic (155-166 Ma) and early Early Cretaceous (145-138 Ma) age only occur in the Great Xing'an Range and the northern Hebei and western Liaoning provinces (limited to the west of the Songliao Basin), and they belong chemically to high-K calc-alkaline series and A-type rhyolites, respectively. Combined with the regional unconformity and thrust structures in the northern Hebei and western Liaoning provinces, we conclude that these volcanics formed during a collapse or delamination of a thickened continental crust related to the evolution of the Mongol-Okhotsk suture belt. The late Early Cretaceous volcanic rocks, widely distributed in NE China, belong chemically to a low- to medium-K calc-alkaline series in the eastern Heilongjiang-Jilin provinces (i.e., the Eurasian continental margin), and to a bimodal volcanic rock association within both the Songliao Basin and the Great Xing'an Range. The volcanics in the eastern Heilongjiang-Jilin provinces formed in an active continental margin setting related to the subduction of the Paleo-Pacific Plate beneath the Eurasian continent, and the bimodal volcanics formed under an extensional environment related either to a backarc setting or to delamination of a thickened crust, or both. Late Cretaceous volcanics, limited to the eastern Heilongjiang-Jilin provinces and the eastern North China Craton (NCC), consist of calc-alkaline rocks in the eastern Heilongjiang-Jilin provinces and alkaline basalts in the eastern NCC, suggesting that the former originated during subduction of the Paleo-Pacific Plate beneath the Eurasian continent, whereas the latter formed in an extensional environment similar to a backarc setting.

Taking all this into account, we conclude that (1) the transformation from the Paleo-Asian Ocean regime to the circum-Pacific tectonic regime happened during the Late Triassic to Early Jurassic; (2) the effect of the Mongol-Okhotsk suture belt on NE China was mainly in the Early Jurassic, Middle-Late Jurassic, and early Early Cretaceous; and (3) the late Early Cretaceous and Late Cretaceous volcanics can be attributed to the subduction of the Paleo-Pacific Plate beneath the Eurasian continent. (C) 2013 Elsevier Ltd. All rights reserved.

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第 306 条，共 321 条

标题: China's regional energy and environmental efficiency: A DEA window analysis based dynamic evaluation

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摘要: Data envelopment analysis (DEA) has recently become a popular approach in measuring the energy and environmental performance at the macro-economy level. A common limitation of several previous studies is that they ignored the undesirable outputs and did not consider the separation of inputs into energy resources and non-energy resources under the DEA framework. Thus, within a joint production framework of considering both desirable and undesirable outputs, as well as energy and non-energy inputs, this study analyzes China's regional total-factor energy and environmental efficiency. This paper utilizes improved DEA models to measure the energy and environmental efficiency of 29 administrative regions of China during the period of 2000-2008. In addition, the DEA window analysis technique is applied to measure the efficiency in cross-sectional and time-varying data. The empirical results show that the east area of China has the highest energy and environmental efficiency, while the efficiency of the west area is worst. All three areas of China have similar trends in the variation of efficiency and in general the energy and environmental efficiency of China slightly increased from 2000 to 2008. The regions of the east area have a more balanced development than the regions of the central area and west area according to energy and environmental efficiency. (C) 2011 Elsevier Ltd. All rights reserved.

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第 307 条，共 321 条

标题: Mechanisms of shale gas storage: Implications for shale gas exploration in China

作者: Hao, F (Hao, Fang); Zou, HY (Zou, Huayao); Lu, YC (Lu, Yongchao)

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摘要: This article reviews the mechanisms of shale gas storage and discusses the major risks or uncertainties for shale gas exploration in China. At a given temperature and pressure, the gas sorption capacities of organic-rich shales are primarily controlled by the organic matter richness but may be significantly influenced by the type and maturity of the organic matter, mineral composition (especially clay content), moisture content, pore volume and structure, resulting in different ratios of gas sorption capacity (GSC) to total organic carbon content for different shales. In laboratory experiments, the GSC of organic-rich shales increases with increasing pressure and decreases with increasing temperature. Under geologic conditions (assuming hydrostatic pressure gradient and constant thermal gradient), the GSC increases initially with depth due to the predominating effect of pressure, passes through a maximum, and then decreases because of the influence of increasing temperature at greater depth. This pattern of variation is quite similar to that observed for coals and is of great significance for understanding the changes in GSC of organic-rich shales over geologic time as a function of burial history. At an elevated temperature and pressure and with the presence of moisture, the gas sorption capacities of organic-rich shales are quite low. As a result, adsorption alone cannot protect sufficient gas for high-maturity organic-rich shales to be commercial gas reservoirs. Two models are proposed to predict the variation of GSC and total gas content over geologic time as a function of burial history. High contents of free gas in organic-rich shales can be preserved in relatively closed systems. Loss of free gas during postgeneration uplift and erosion may result in undersaturation (the total gas contents lower than the sorption capacity) and is the major risk for gas exploration in marine organic-rich shales in China.

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第 308 条，共 321 条

标题: Locating South China in Rodinia and Gondwana: A fragment of greater India lithosphere?

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摘要: From the formation of Rodinia at the end of the Mesoproterozoic to the commencement of Pangea breakup at the end of the Paleozoic, the South China craton first formed and then occupied a position adjacent to Western Australia and northern India. Early Neoproterozoic suprasubduction zone magmatic arc-backarc assemblages in the craton range in age from ca. 1000 Ma to 820 Ma and display a sequential northwest decrease in age. These relations suggest formation and closure of arc systems through southeast-directed subduction, resulting in progressive northwestward accretion onto the periphery of an already assembled Rodinia. Siliciclastic units within an early Paleozoic succession that transgresses across the craton were derived from the southeast and include detritus from beyond the current limits of the craton. Detrital zircon age spectra require an East Gondwana source and are very similar to the Tethyan Himalaya and younger Paleozoic successions from Western Australia, suggesting derivation from a common source and by inference accumulation in linked basins along the northern margin of Gondwana, a situation that continued until rifting and breakup of the craton in the late Paleozoic.

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第 309 条，共 321 条

标题: Parameter extraction of solar cell models using repaired adaptive differential evolution

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来源出版物: SOLAR ENERGY 卷: 94 页: 209-220 DOI: 10.1016/j.solener.2013.05.007 出版年: AUG 2013

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摘要: Parameter extraction of solar cell models plays an important role in the simulation and design calculation of photovoltaic (PV) systems. In this paper, in order to fast and accurately extract the solar cell parameters, an improved adaptive differential evolution with crossover rate repairing technique and ranking-based mutation is proposed. The proposed method is referred to as R-cr-IJADE, which is an improved version of JADE. In R-cr-IJADE, including the parameter adaptation presented in JADE, the crossover rate repairing technique and the ranking-based mutation are also synergized to improve the performance of JADE when solving the parameter extraction problems of solar cell models. In order to verify the performance of R-cr-IJADE, it is used to extract the parameters of different solar cell models, i.e., single diode, double diode, and PV module. Compared with other parameter extraction techniques, experimental results indicate the superiority of R-cr-IJADE in terms of the quality of final solutions, success rate, and convergence speed. In addition, the simulated data with the extracted parameters of R-cr-IJADE are in very good agreement with the experimental data in all cases. (C) 2013 Elsevier Ltd. All rights reserved.

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第 310 条，共 321 条

标题: Adsorption of tetracycline and chloramphenicol in aqueous solutions by bamboo charcoal: A batch and fixed-bed column study

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来源出版物: CHEMICAL ENGINEERING JOURNAL 卷: 228 页: 496-505 DOI: 10.1016/j.cej.2013.04.118 出版年: JUL 15 2013

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摘要: Adsorption of two antibiotics, tetracycline (TC) and chloramphenicol (CAP), on a new porous carbonaceous adsorbent, bamboo charcoal (BC), is investigated in batch and fixed bed column experiments. Adsorption isotherms of TC and CAP obtained from batch experiments are better fitted by Freundlich and Dubinin-Radushkevich models compared with Langmuir model. In the fixed bed column experiments, lower bed height, higher flow rate and lower influent contaminant concentration lead to greater adsorption of TC and CAP on BC. A mass transfer model that incorporates both surface and intraparticle diffusion theory into the convection-dispersion equation (CDE) is developed to identify the key process controlling the rate of TC and CAP adsorption. The results demonstrate that the surface diffusion is the rate-limiting step for antibiotics adsorption onto BC, which is consistent with the results of traditional Adams-Bohart model. pi-pi Electro-donor-acceptor (EDA), cation-pi bond in conjunction with hydrogen bonding interaction are the main mechanisms for the adsorption of TC and CAP on BC, while the hydrophobic interaction and electrostatic interaction have minor contributions. (C) 2013 Elsevier B.V. All rights reserved.

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第 311 条，共 321 条

标题: Metallogeny of the North China Craton: Link with secular changes in the evolving Earth

作者: Zhai, MG (Zhai, Mingguo); Santosh, M (Santosh, M.)

来源出版物: GONDWANA RESEARCH 卷: 24 期: 1 特刊: SI 页: 275-297 DOI: 10.1016/j.gr.2013.02.007 出版年: JUL 2013

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摘要: The North China Craton (NCC) has experienced a complex geological evolution since the early Precambrian, and carries important records of secular changes in tectonics and metallogeny. Here we synthesize the salient geological and tectonic features of the evolution and destruction of the NCC vis-a-vis major metallogenic events, and the formation of potential ore deposits. We identify a close relationship between the major geological events in the NCC and those reported elsewhere on the globe. We trace the records of a regular change in the pattern of metallogeny, mineral deposit character, spatial distribution and genetic mechanisms, which closely match the timing and styles of the major geological and tectonic events in this craton.

The NCC went through five major tectonic cycles: (1) Neoarchean crustal growth and stabilization, (2) Paleoproterozoic rifting-subduction-accretion-collision with imprints of the Great Oxidation Event (GOE), (3) Late Paleoproterozoic-Neoproterozoic multi-stage rifting, (4) Paleozoic orogenesis at the margins of the craton, and (5) Mesozoic extensional tectonics associated with lithospheric thinning and decratonization. Coinciding with these major geological events are five major metallogenic systems identified as follows: (I) an Archean BIF system, (2) Paleoproterozoic Cu-Pb-Zn and Mg-B systems, (3) a Mesoproterozoic REE-Fe-Pb-Zn system, (4) a Paleozoic orogenic Cu-Mo system, and (5) Mesozoic intracontinental Au and Ag-Pb-Zn and Mo systems. The ore-deposit types in each of these metallogenic systems show distinct characteristics and tectonic affinities. From Early Precambrian through Late Precambrian to Paleozoic and Mesozoic, the NCC records a transition from primitive- to modern-style plate tectonics. Evidence for imbricated oceanic plate stratigraphy in a subduction-accretion setting, and collisional orogenesis along at least three major zones of ocean closure are documented. Major transitions in tectonic style and surface environmental changes recorded in other parts of the world are also reflected in the geological history and metallogenic events in the NCC. Large-scale gold deposits formed through intraplate tectonics during the Mesozoic provide important insights into mantle dynamics and crust-mantle interaction associated with lithospheric thinning and craton destruction. The NCC provides one of the best examples for documenting secular changes in the geological history and metallogenic epochs of an evolving Earth. (C) 2013 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 312 条，共 321 条

标题: Tectonics of the North Qilian orogen, NW China

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来源出版物: GONDWANA RESEARCH 卷: 23 期: 4 特刊: SI 页: 1378-1401 DOI: 10.1016/j.gr.2012.02.004 出版年: MAY 2013

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摘要: The Qilian Orogen at the northern margin of the Tibetan Plateau is a type suture zone that recorded a complete history from continental breakup to ocean basin evolution, and to the ultimate continental collision in the time period from the Neoproterozoic to the Paleozoic. The Qilian Ocean, often interpreted as representing the "Proto-Tethyan Ocean", may actually be an eastern branch of the worldwide "Iapetus Ocean" between the two continents of Baltica and Laurentia, opened at >= 710 Ma as a consequence of breakup of supercontinent Rodinia.

Initiation of the subduction in the Qilian Ocean probably occurred at similar to 520 Ma with the development of an Andean-type active continental margin represented by infant arc magmatism of similar to 517-490 Ma. In the beginning of Ordovician (similar to 490 Ma), part of the active margin was split from the continental Alashan block and the Andean-type active margin had thus evolved to western Pacific-type trench-arc-back-arc system represented by the MORB-like crust (i.e., SSZ-type ophiolite belt) formed in a back-arc basin setting in the time period of similar to 490-445 Ma. During this time, the subducting oceanic lithosphere underwent LT-HP metamorphism along a cold geotherm of similar to 6-7 degrees C/km.

The Qilian Ocean was closed at the end of the Ordovician (similar to 445 Ma). Continental blocks started to collide and the northern edge of the Qilian-Qaidam block was underthrust/dragged beneath the Alashan block by the downgoing oceanic lithosphere to depths of similar to 100-200 km at about 435-420 Ma. Intensive orogenic activities occurred in the late Silurian and early Devonian in response to the exhumation of the subducted crustal materials.

Briefly, the Qilian Orogen is conceptually a type example of the workings of plate tectonics from continental breakup to the development and evolution of an ocean basin, to the initiation of oceanic subduction and formation of arc and back-arc system, and to the final continental collision/subduction and exhumation. (C) 2012 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 313 条，共 321 条

标题: Tectonic evolution of a composite collision orogen: An overview on the Qinling-Tongbai-Hong'an-Dabie-Sulu orogenic belt in central China

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摘要: The formation of collisional orogens is a prominent feature in convergent plate margins. It is generally a complex process involving multistage tectonism of compression and extension due to continental subduction and collision. The Paleozoic convergence between the South China Block (SCB) and the North China Block (NCB) is associated with a series of tectonic processes such as oceanic subduction, terrane accretion and continental collision, resulting in the Qinling-Tongbai-Hong'an-Dabie-Sulu orogenic belt. While the arc-continent collision orogeny is significant during the Paleozoic in the Qinling-Tongbai-Hong'an orogens of central China, the continent-continent collision orogeny is prominent during the early Mesozoic in the Dabie-Sulu orogens of east-central China. This article presents an overview of regional geology, geochronology and geochemistry for the composite orogenic belt. The Qinling-Tongbai-Hong'an orogens exhibit the early Paleozoic HP-UHP metamorphism, the Carboniferous HP metamorphism and the Paleozoic arc-type magmatism, but the three tectonothermal events are absent in the Dabie-Sulu orogens. The Triassic UHP metamorphism is prominent in the Dabie-Sulu orogens, but it is absent in the Qinling-Tongbai orogens. The Hong'an orogen records both the HP and UHP metamorphism of Triassic age, and collided continental margins contain both the juvenile and ancient crustal rocks. So do in the Qinling and Tongbai orogens. In contrast, only ancient crustal rocks were involved in the UHP metamorphism in the Dabie-Sulu orogenic belt, without involvement of the juvenile arc crust. On the other hand, the deformed and low-grade metamorphosed accretionary wedge was developed on the passive continental margin during subduction in the late Permian to early Triassic along the northern margin of the Dabie-Sulu orogenic belt, and it was developed on the passive oceanic margin during subduction in the early Paleozoic along the northern margin of the Qinling orogen.

Three episodes of arc-continent collision are suggested to occur during the Paleozoic continental convergence between the SCB and NCB. The first episode of arc-continent collision is caused by northward subduction of the North Qinling unit beneath the Erlangping unit, resulting in UHP metamorphism at ca. 480-490 Ma and the accretion of the North Qinling unit to the NCB. The second episode of arc-continent collision is caused by northward subduction of the Prototethyan oceanic crust beneath an Andes-type continental arc, leading to granulite-facies metamorphism at ca. 420-430 Ma and the accretion of the Shangdan arc terrane to the NCB and reworking of the North Qinling, Erlangping and Kuanping units. The third episode of arc-continent collision is caused by northward subduction of the Paleotethyan oceanic crust, resulting in the HP edogite-facies metamorphism at ca. 310 Ma in the Hong'an orogen and low-P metamorphism in the Qinling-Tongbai orogens as well as crustal accretion to the NCB. The closure of backarc basins is also associated with the arc-continent collision processes, with the possible cause for granulite-facies metamorphism. The massive continental subduction of the SCB beneath the NCB took place in the Triassic with the final continent-continent collision and UHP metamorphism at ca. 225-240 Ma. Therefore, the Qinling-Tongbai-Hong'an-Dabie-Sulu orogenic belt records the development of plate tectonics from oceanic subduction and arc-type magmatism to arc-continent and continent-continent collision. (C) 2012 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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第 314 条，共 321 条

标题: The origin and pre-Cenozoic evolution of the Tibetan Plateau

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摘要: Different hypotheses have been proposed for the origin and pre-Cenozoic evolution of the Tibetan Plateau as a result of several collision events between a series of Gondwana-derived terranes (e.g., Qiangtang, Lhasa and India) and Asian continent since the early Paleozoic. This paper reviews and reevaluates these hypotheses in light of new data from Tibet including (1) the distribution of major tectonic boundaries and suture zones, (2) basement rocks and their sedimentary covers, (3) magmatic suites, and (4) detrital zircon constraints from Paleozoic metasedimentary rocks. The Western Qiangtang, Amdo, and Tethyan Himalaya terranes have the Indian Gondwana origin, whereas the Lhasa Terrane shows an Australian Gondwana affinity. The Cambrian magmatic record in the Lhasa Terrane resulted from the subduction of the proto-Tethyan Ocean lithosphere beneath the Australian Gondwana. The newly identified late Devonian granitoids in the southern margin of the Lhasa Terrane may represent an extensional magmatic event associated with its rifting, which ultimately resulted in the opening of the Songdo Tethyan Ocean. The Lhasa-northern Australia collision at similar to 263 Ma was likely responsible for the initiation of a southward-dipping subduction of the Bangong-Nujiang Tethyan Oceanic lithosphere. The Yarlung-Zangbo Tethyan Ocean opened as a back-arc basin in the late Triassic, leading to the separation of the Lhasa Terrane from northern Australia. The subsequent northward subduction of the Yarlung-Zangbo Tethyan Ocean lithosphere beneath the Lhasa Terrane may have been triggered by the Qiangtang-Lhasa collision in the earliest Cretaceous. The mafic dike swarms (ca. 284 Ma) in the Western Qiangtang originated from the Panjal plume activity that resulted in continental rifting and its separation from the northern Indian continent. The subsequent collision of the Western Qiangtang with the Eastern Qiangtang in the middle Triassic was followed by slab breakoff that led to the exhumation of the Qiangtang metamorphic rocks. This collision may have caused the northward subduction initiation of the Bangong-Nujiang Ocean lithosphere beneath the Western Qiangtang. Collision-related coeval igneous rocks occurring on both sides of the suture zone and the within-plate basalt affinity of associated mafic lithologies suggest slab breakoff-induced magmatism in a continent-continent collision zone. This zone may be the site of net continental crust growth, as exemplified by the Tibetan Plateau. (C) 2012 International Association for Gondwana Research. Published by Elsevier B.V. All rights reserved.

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标题: Regional allocation of CO2 emissions allowance over provinces in China by 2020

作者: Wang, K (Wang, Ke); Zhang, X (Zhang, Xian); Wei, YM (Wei, Yi-Ming); Yu, SW (Yu, Shiwei)

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摘要: The mitigation efforts of China are increasingly important for meeting global climate target since the rapid economic growth of China has led to an increasing share in the world's total CO2 emissions. This paper sets out to explore the approach for realizing China's national mitigation targets submitted to the UNFCCC as part of the Copenhagen Accord; that is, to reduce the intensity of CO2 emissions per unit of GDP by 40-45% by 2020, as well as reducing the energy intensity and increasing the share of non-fossil fuel consumption, through regional allocation of emission allowance over China's provinces. Since the realization of China's mitigation target essentially represents a total amount emission allowance allocation problem, an improved zero sum gains data envelopment analysis optimization model, which could deal with the constant total amount resources allocation, is proposed in this study. By utilizing this model and based on several scenarios of China's economic growth, CO2 emissions, and energy consumption, a new efficient emission allowance allocation scheme on provincial level for China by 2020 is proposed. The allocation results indicate that different provinces have to shoulder different mitigation burdens in terms of emission intensity reduction, energy intensity reduction, and share of non-fossil fuels increase. (c) 2012 Elsevier Ltd. All rights reserved.

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第 316 条，共 321 条

标题: Pyrite as a record of hydrothermal fluid evolution in a porphyry copper system: A SIMS/EMPA trace element study

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摘要: Porphyry copper deposits are currently the world's largest source of copper and molybdenum, and are also among the largest reservoirs of gold in the upper crust. Despite the fact that pyrite is a ubiquitous mineral phase in these deposits and secondary Cu enrichment processes are commonly controlled by the abundance of this sulfide, the major and trace element chemistry of pyrite from porphyry systems remains unconstrained. In this study, we report the first comprehensive trace element database of pyrite from the Dexing deposit, China's largest porphyry Cu deposit. By combining high-spatial resolution and X-ray mapping capabilities of electron microprobe analysis (EMPA) with low detection limits and depth-profiling capabilities of secondary-ion mass spectrometry (SIMS) in a suite of samples from the Dexing deposit, we show that the concentrations of precious metals (e. g., Au, Ag), metalloids (e. g., As, Sb, Se, Te) and heavy metals (e. g., Cu, Co, Ni, Zn, Hg) in pyrite from porphyry systems are more significant than previously thought. Among the elements analyzed, Cu, As, Au and Ni are the most abundant with concentrations that vary from sub-ppm levels to a few wt.% (i.e., similar to 6 wt.% Cu, similar to 3 wt.% As, similar to 0.25 wt.% Au, and similar to 0.2 wt.% Ni). Detailed wavelength-dispersive spectrometry (WDS) X-ray maps and SIMS depth vs. isotope concentration profiles reveal that pyrite from the Dexing deposit is characterized by complex chemical zoning where the studied elements occur in different mineralogical forms. While As occurs as a structurally bound element in pyrite, Cu and Au can occur as both solid solution and micro- to nano-sized particles of chalcopyrite and native Au (or Au tellurides), respectively, indicating that pyrite can control metal speciation and partitioning during porphyry Cu mineralization. The well-developed oscillatory zoning detected in pyrite, where Cu-rich, As-depleted growth zones alternate with Cu-depleted, As-rich layers, indicates that Cu is geochemically decoupled from As, suggesting that this selective partitioning of metals into pyrite is most likely the result of changes in hydrothermal fluid composition. (C) 2012 Elsevier Ltd. All rights reserved.

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标题: Major types and time-space distribution of Mesozoic ore deposits in South China and their geodynamic settings

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来源出版物: MINERALIUM DEPOSITA 卷: 48 期: 3 页: 267-294 DOI: 10.1007/s00126-012-0446-z 出版年: MAR 2013

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摘要: The ore deposits of the Mesozoic age in South China can be divided into three groups, each with different metal associations and spatial distributions and each related to major magmatic events. The first event occurred in the Late Triassic (230-210 Ma), the second in the Mid-Late Jurassic (170-150 Ma), and the third in the Early-Mid Cretaceous (120-80 Ma). The Late Triassic magmatic event and associated mineralization is characterized by peraluminous granite-related W-Sn-Nb-Ta mineral deposits. The Triassic ore deposits are considerably disturbed or overprinted by the later Jurassic and Cretaceous tectono-thermal episodes. The Mid-Late Jurassic magmatic and mineralization events consist of 170-160 Ma porphyry-skarn Cu and Pb-Zn-Ag vein deposits associated with I-type granites and 160-150 Ma metaluminous granite-related polymetallic W-Sn deposits. The Late Jurassic metaluminous granite-related W-Sn deposits occur in a NE-trending cluster in the interior of South China, such as in the Nanling area. In the Early-Mid Cretaceous, from about 120 to 80 Ma, but peaking at 100-90 Ma, subvolcanic-related Fe deposits developed and I-type calc-alkaline granitic intrusions formed porphyry Cu-Mo and porphyry-epithermal Cu-Au-Ag mineral systems, whereas S-type peraluminous and/or metaluminous granitic intrusions formed polymetallic Sn deposits. These Cretaceous mineral deposits cluster in distinct areas and are controlled by pull-apart basins along the South China continental margin. Based on mineral assemblage, age, and space-time distribution of these mineral systems, integrated with regional geological data and field observations, we suggest that the three magmatic-mineralization episodes are the result of distinct geodynamic regimes. The Triassic peraluminous granites and associated W-Sn-Nb-Ta mineralization formed during post-collisional processes involving the South China Block, the North China Craton, and the Indo-China Block, mostly along the Dabie-Sulu and Songma sutures. Jurassic events were initially related to the shallow oblique subduction of the Izanagi plate beneath the Eurasian continent at about 175 Ma, but I-type granitoids with porphyry Cu and vein-type Pb-Zn-Ag deposits only began to form as a result of the breakup of the subducted plate at 170-160 Ma, along the NNE-trending Qinzhou-Hangzhou belt (also referred to as Qin-Hang or Shi-Hang belt), which is the Neoproterozoic suture that amalgamates the Yangtze Craton and Cathaysia Block. A large subduction slab window is assumed to have formed in the Nanling and adjacent areas in the interior of South China, triggering the uprise of asthenospheric mantle into the upper crust and leading to the emplacement of metaluminous granitic magma and associated polymetallic W-Sn mineralization. A relatively tectonically quiet period followed between 150 and 135 Ma in South China. From 135 Ma onward, the angle of convergence of the Izanagi plate changed from oblique to parallel to the coastline, resulting in continental extensional tectonics and reactivation of regional-scale NE-trending faults, such as the Tan-Lu fault. This widespread extension also promoted the development of NE-trending pull-apart basins and metamorphic core complexes, accompanied by volcanism and the formation of epithermal Cu-Au deposits, granite-related polymetallic Sn-(W) deposits and hydrothermal U deposits between 120 and 80 Ma (with a peak activity at 100-90 Ma).

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第 318 条，共 321 条

标题: Diversity enhanced particle swarm optimization with neighborhood search

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来源出版物: INFORMATION SCIENCES 卷: 223 页: 119-135 DOI: 10.1016/j.ins.2012.10.012 出版年: FEB 20 2013

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摘要: Particle swarm optimization (PSO) has shown an effective performance for solving variant benchmark and real-world optimization problems. However, it suffers from premature convergence because of quick losing of diversity. In order to enhance its performance, this paper proposes a hybrid PSO algorithm, called DNSPSO, which employs a diversity enhancing mechanism and neighborhood search strategies to achieve a trade-off between exploration and exploitation abilities. A comprehensive experimental study is conducted on a set of benchmark functions, including rotated multimodal and shifted high-dimensional problems. Comparison results show that DNSPSO obtains a promising performance on the majority of the test problems. (C) 2012 Elsevier Inc. All rights reserved.

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第 319 条，共 321 条

标题: The link between reduced porphyry copper deposits and oxidized magmas

作者: Sun, WD (Sun, Wei-dong); Liang, HY (Liang, Hua-ying); Ling, MX (Ling, Ming-xing); Zhan, MZ (Zhan, Mei-zhen); Ding, X (Ding, Xing); Zhang, H (Zhang, Hong); Yang, XY (Yang, Xiao-yong); Li, YL (Li, Yi-liang); Ireland, TR (Ireland, Trevor R.); Wei, QR (Wei, Qi-rong); Fan, WM (Fan, Wei-ming)

来源出版物: GEOCHIMICA ET COSMOCHIMICA ACTA 卷: 103 页: 263-275 DOI: 10.1016/j.gca.2012.10.054 出版年: FEB 15 2013

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摘要: Porphyry copper deposits account for more than 80% of the world's total Cu resources. However, the formation mechanism and controlling factors of porphyry copper deposits remain obscure. Previous studies have revealed that porphyry copper deposits are usually associated with oxidized, calc-alkalic, adakitic shallow intrusive rocks. Here we show that hematite-magnetite intergrowths are commonly found in porphyry copper deposits, suggesting high and fluctuating oxygen fugacity (fO(2)). Oxidation promotes the destruction of sulfides in the magma source, and thereby increases initial chalcophile element concentrations. Sulfide remains undersaturated during the evolution of oxidized sulfur-enriched magmas where sulfate is the dominant sulfur species, leading to high chalcophile element concentrations in evolved magmas. The final porphyry copper mineralization is controlled by sulfate reduction, which starts with magnetite crystallization, accompanied by decreasing pH and correspondingly increasing fO(2). Hematite forms once sulfate reduction lowers the pH sufficiently and the fO(2) reaches the hematite-magnetite oxygen fugacity buffer, which in turn increases the pH for a given fO(2). The oxidation of ferrous iron during the crystallization of magnetite and hematite is the causal process of sulfate reduction and consequent mineralization. Therefore, the initial pH and fO(2) ranges of porphyries favorable for porphyry copper mineralization are defined by the hematite-magnetite oxygen fugacity buffer and SO42--HS--S-3(-) reaction lines. Adakitic rocks have higher initial contents of copper, sulfur and iron than normal arc rocks, and thus are the best candidates for porphyry copper deposits. These provide a plausible explanation for the formation of copper porphyry deposits. The hematite-magnetite intergrowth marks the upper limits of fO(2) favorable for the mineralization, and thus may be a powerful tool for future prospecting of large porphyry copper deposits. (c) 2012 Elsevier Ltd. All rights reserved.

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第 320 条，共 321 条

标题: Pore structure and its impact on CH4 adsorption capacity and flow capability of bituminous and subbituminous coals from Northeast China

作者: Cai, YD (Cai, Yidong); Liu, DM (Liu, Dameng); Pan, ZJ (Pan, Zhejun); Yao, YB (Yao, Yanbin); Li, JQ (Li, Junqian); Qiu, YK (Qiu, Yongkai)

来源出版物: FUEL 卷: 103 页: 258-268 DOI: 10.1016/j.fuel.2012.06.055 出版年: JAN 2013

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摘要: Adsorption-pore (pore size less than 100 nm) and seepage-pore (pore size greater than 100 nm) structures have great effects on gas adsorption/diffusion and gas flow in coal seam, respectively. Pore properties, including porosity, size/volume distribution, volumes, surface fractals, specific surface area, and connectivity, for four coals from Northeast China were acquired through mercury porosimetry, N-2 adsorption at 77 K, small angle X-ray scattering (SAXS) and their relationships with CH4 adsorption capacity and permeability are investigated. The roughness of pore surface was analyzed with surface fractal dimensions. Obtained values of fractal dimensions from mercury porosimetry and N-2 adsorption at 77 K were comparable with values determined by SAXS measurement. The surface fractals results show that the more irregular surface, the more inhomogeneous pore structures is, meaning more surface area and then stronger adsorption capability, especially for the micropores with sizes in the range of 2-10 nm and the mesopores. Moreover, with the data of petrographic, proximate and ultimate analyses, the ratio of C/H, moisture content, ash yield also have great effects on CH4 adsorption capacity of coals. For bituminous and subbituminous coals, macropores have significant impacts on gas flow. The coals with high contents of macroporosity generally have good gas flow capability. Therefore, they may have significant implications for coalbed methane (CBM) exploitation. (C) 2012 Elsevier Ltd. All rights reserved.

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第 321 条，共 321 条

标题: Two pulses of extinction during the Permian-Triassic crisis

作者: Song, HJ (Song, Haijun); Wignall, PB (Wignall, Paul B.); Tong, JN (Tong, Jinnan); Yin, HF (Yin, Hongfu)

来源出版物: NATURE GEOSCIENCE 卷: 6 期: 1 页: 52-56 DOI: 10.1038/NGEO1649 出版年: JAN 2013

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摘要: The Permian-Triassic mass extinction is the most severe biotic crisis identified in Earth history. Over 90% of marine species were eliminated(1,2), causing the destruction of the marine ecosystem structure(3). This biotic crisis is generally interpreted as a single extinction event around 252.3 million years ago(2,4-6), and has been variously attributed to the eruption of the Siberian Traps or possibly a bolide impact(7-10). Here we demonstrate that the marine extinction consisted of two pulses, separated by a 180,000-year recovery phase. We evaluated the range of 537 species representing 17 marine groups in seven Chinese sections from a 450,000-year interval spanning the Permian-Triassic boundary. The first stage of extinction occurred during the latest Permian, and was marked by the extinction of 57% of species, namely all plankton and some benthic groups, including algae, rugose corals, and fusulinids. The second phase occurred in the earliest Triassic, and resulted in the extinction of 71% of the remaining species. This second extinction phase fundamentally altered the marine ecosystem structure that had existed for the previous 200 million years. Because the two pulses showed different extinction selectivity, we conclude that they may have had different environmental causes.

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热点论文：

第 1 条，共 21 条

标题: Mineralization regularity, scientific issues, prospecting technology and research prospect of Co.Ni deposits in China.

作者: Su, BX (Su BenXun); Qin, KZ (Qin KeZhang); Jiang, SY (Jiang ShaoYong); Cao, MJ (Cao MingJian); Zhang, ZC (Zhang ZhaoChong); Zhang, HL (Zhang HongLuo); Xue, GQ (Xue GuoQiang); Zhou, TF (Zhou TaoFa); Mo, JP (Mo JiangPing)

来源出版物: ACTA PETROLOGICA SINICA 卷: 39 期: 4 页: 968-980 DOI: 10.18654/1000.0569/2023.04.02 出版年: APR 2023

Web of Science 核心合集中的 "被引频次": 7

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摘要: TherearefourmajortypesofCo.Nideposits,namely,magmatic,lateritic,(meta.)sedimentaryrock.hosted,and hydrothermaltypes.Inthisstudy,weproposedthatmanyoftheseCo.Nidepositsarecompositedepositsthatarecharacterizedwith commonfeaturesofmultipledeposittypesormultiple.metalelementassemblages,andthesedepositsareimportantbridgesthatcanlink differentdeposittypes,metallogenictheory,andmodelsfororeformationandtheirexploration. Withaspectsofmetalelement occurrences,Ni.dominateddepositsmostlyaccompanyCoenrichmentuptoeconomicgrade,whereasCo.dominateddepositsmaynotbe richinNi.ElementalgeochemistryrevealsthatCoandNicommonlycoexistwithinmagmaticsystem,whiletheycouldseparatelyoccur duringhydrothermal,weatheringandsedimentaryprocesses.Hence,thekeyscientificissuerelevanttoCo.Nimineralizationisthe mechanism ofcoexistenceandseparationofCoandNiintheabove.mentionedprocesses. ToconstructacomprehensiveCo.Ni metallogenictheoryrequiresexperimentalpetrology,numericalmodeling,characterizationsofoccurrenceandenrichmentofCoandNi inadditiontostudiesoftypicalandcompositedeposits.Moreover,morestudiesareneededincludingcouplingofCo.Nimineralization andimportantglobalgeologicaleventsingeologictimeframework,petrogenesisandtectonicsettingofvariousmafic.ultramaficmassifs, andeffectsofhydrothermalmodificationsonCosuper.enrichment.MostCo.Niorebodiesandtheirhostrocksarehighlyvariablein occurrenceandhavesimilargeophysicalpropertiesinmanycaseswithnumerousCo.andNi.bearingphases.Thesecallonmultiple prospectingtechniquesformineralexplorationandevaluation,including:(1)geophysicaltechnologyforidentificationandextractionof ore.relatedsignalsundertheinterferenceofthecarbonaceouslayer;(2)highlysensitiveidentificationtechnologyofsmallintrusions andsteeply.inclinedorebodies;(3)matchingcorrelationofmultipleinformationandore.bearingevaluationtechnology.Considering thecharacteristicsofCo.NidepositsinChina,prospectingtechniquesformagmatictypesshouldbefirstlydeveloped,while(meta.)sedimentaryrock.hostedandhydrothermalCo.Nidepositsmayemployexplorationtechnologyofsyn.geneticdepositsormainmineral deposits

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第 2 条，共 21 条

标题: Privacy-Preserving Fast Three-Factor Authentication and Key Agreement for IoT-Based E-Health Systems

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来源出版物: IEEE TRANSACTIONS ON SERVICES COMPUTING 卷: 16 期: 2 页: 1324-1333 DOI: 10.1109/TSC.2022.3149940 出版年: MAR-APR 2023

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摘要: Electronic healthcare (e-health) systems have received renewed interest, particularly in the current COVID-19 pandemic (e.g., lockdowns and changes in hospital policies due to the pandemic). However, ensuring security of both data-at-rest and data-in-transit remains challenging to achieve, particularly since data is collected and sent from less insecure devices (e.g., patients' wearable or home devices). While there have been a number of authentication schemes, such as those based on three-factor authentication, to provide authentication and privacy protection, a number of limitations associated with these schemes remain (e.g., (in)security or computationally expensive). In this study, we present a privacy-preserving three-factor authenticated key agreement scheme that is sufficiently lightweight for resource-constrained e-health systems. The proposed scheme enables both mutual authentication and session key negotiation in addition to privacy protection, with minimal computational cost. The security of the proposed scheme is demonstrated in the Real-or-Random model. Experiments using Raspberry Pi show that the proposed scheme achieves reduced computational cost (of up to 89.9% in comparison to three other related schemes).

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第 3 条，共 21 条

标题: Asymmetric propagation mechanism of hydraulic fracture networks in continental reservoirs

作者: Liu, JS (Liu, Jingshou); Mei, LF (Mei, Lianfu); Ding, WL (Ding, Wenlong); Xu, K (Xu, Ke); Yang, HM (Yang, Haimeng); Liu, Y (Liu, Yang)

来源出版物: GEOLOGICAL SOCIETY OF AMERICA BULLETIN 卷: 135 期: 3-4 页: 678-688 DOI: 10.1130/B36358.1 出版年: MAR 1 2023

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摘要: Hydraulic fracturing technology is relatively mature in North America, but under complex geological conditions, such as those in China, the application of this technology still faces great challenges. At present, techniques for the numerical simulation of hydraulic fracture networks are mainly based on the prediction of the fracture half-height and half-length, which cannot capture the heterogeneity of continental low-permeability sandstone reservoirs in China and the distribution of the asymmetric hydraulic fracture network present in them. Therefore, determining the asymmetric propagation mechanism of hydraulic fracture networks is very important for improving the recovery rates of continental reservoirs. In this paper, taking the Ordos Basin in China as an example, the spatial distribution of the stress field of a heterogeneous continental reservoir is precisely predicted by reservoir mechanical heterogeneity modeling. By using a microseismic monitoring method, the 3-D morphology of the hydraulic fracture network is determined. Through the coupling of multisource data, the frequency distributions of the determined in situ stress magnitudes in different hydraulic fracturing stages are obtained. The propagation direction of the hydraulic fracture network changes under the control of the horizontal stress difference (Delta sigma) and the presence of natural fractures. The smaller Delta sigma is, the greater the deflection of the hydraulic fracture propagation direction. The asymmetric propagation of these fractures is related to the frequency distribution of Delta sigma. As the frequency of Delta sigma approaches a normal distribution, the two wings of the hydraulic fracture network become basically equal in length, and as Delta sigma deviates more from a normal distribution, the difference between the two wings of the hydraulic fracture network increases. These research results will provide new insight for modeling, exploring, and developing continental reservoirs.

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第 4 条，共 21 条

标题: K-Means Clustering-Based Kernel Canonical Correlation Analysis for Multimodal Emotion Recognition in Human-Robot Interaction

作者: Chen, LF (Chen, Luefeng); Wang, KL (Wang, Kuanlin); Li, M (Li, Min); Wu, M (Wu, Min); Pedrycz, W (Pedrycz, Witold); Hirota, K (Hirota, Kaoru)

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摘要: In this article, K-means clustering-based Kernel canonical correlation analysis algorithm is proposed for multimodal emotion recognition in human-robot interaction (HRI). The multimodal features (gray pixels; time and frequency domain) extracted from facial expression and speech are fused based on Kernel canonical correlation analysis. K-means clustering is used to select features from multiple modalities and reduce dimensionality. The proposed approach can improve the heterogenicity among different modalities and make multiple modalities complementary to promote multimodal emotion recognition. Experiments on two datasets, namely SAVEE and eNTER-FACE'05, are conducted to evaluate the accuracy of the proposed method. The results show that the proposed method produces good recognition rates that are higher than the ones produced by the methods without K-means clustering; more specifically, they are 2.77% higher in SAVEE and 4.7% higher in eNTERFACE'05.

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第 5 条，共 21 条

标题: Semi-analytical solution for negative skin friction development on deep foundations in coastal reclamation areas

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摘要: This paper derives a semi-analytical solution to predict the development of negative skin friction, caused by the consolidation of newly filled soil, on piles in the reclamation area. The simulation of the whole consolidation process of the filled soil is realized by coupling the one-dimensional consolidation model before the pile driving with the two-dimensional consolidation model after the pile driving. The negative skin friction generated at the pile shaft during the consolidation is calculated by accounting the pile-soil interactions with the introduction of the load-transfer method. To address the dramatic changes of the pore water pressure at the initial drainage stage in the classic Terzaghi drainage boundary, the continuous drainage boundary is implemented. A semi-analytical solution to the developed model is derived and subsequently validated through the comparisons with the field tests and finite element method (FEM). A comprehensive parametric study is also conducted to demonstrate the effects of the pile installation time, the surcharge load, the consolidation time before or after piling, and the pile head load on the development of negative skin friction. The negative skin friction was found to be vastly different for piles installed immediately after landfilling and those installed close to full consolidation. To optimize construction period while reducing the negative friction on piles, the pile is better to be driven after the time t = 90%TvH2/C-v1 . It is also observed that the surcharge load on the ground could significantly enhance the stiffness and ultimate capacity of the soil, and the workload subjected at the pile head can transfer the "negative" skin friction into the positive shearing resistance.

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第 6 条，共 21 条

标题: Centrifuge modeling of multi-row stabilizing piles reinforced reservoir landslide with different row spacings

作者: Zhang, CY (Zhang, Chenyang); Yin, YP (Yin, Yueping); Yan, H (Yan, Hui); Zhu, SN (Zhu, Sainan); Li, B (Li, Bo); Hou, XF (Hou, Xuefeng); Yang, YT (Yang, Yuting)

来源出版物: LANDSLIDES 卷: 20 期: 3 页: 559-577 DOI: 10.1007/s10346-022-01994-5 提前访问日期: NOV 2022 出版年: MAR 2023

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摘要: The multi-row stabilizing piles have been applied in the stabilization of large-scale reservoir landslides in recent years. However, the mechanical behavior and deformation characteristics of the multi-row stabilizing piles reinforced reservoir landslides have rarely been investigated. This study takes the Taping landslide, a large-scale reservoir landslide in China, as a prototype. Two centrifuge tests were conducted to study the deformation and failure characteristics of the multi-row stabilizing piles reinforced reservoir landslide with two different row spacings. The result shows that the reservoir water level (RWL) drawdown operation induced the soil movement and high downslope driving force, further causing a significant increase in bending moments at the lower section of the piles, with peaking near the sliding zone; eventually, bending deformation and failure occurred more easily near the sliding zone. The downslope part of the piles can change the mechanical transmission behavior of the multi-row stabilizing piles in reservoir landslides. Small row spacing can enhance the mechanical connection between the rows of piles and raise the overall reinforcement capacity of the piles. The large row spacing weakens the mechanical connection between the rows of piles, and the mechanical states of the pile in different rows are relatively independent. As a result, the piles are easily damaged one by one from the first row to the last row, and the overall reinforcement capacity of the multi-row stabilizing piles is poor.

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第 7 条，共 21 条

标题: Centrifuge modelling of landslides and landslide hazard mitigation: A review

作者: Fang, K (Fang, Kun); Tang, HM (Tang, Huiming); Li, CD (Li, Changdong); Su, XX (Su, Xuexue); An, PJ (An, Pengju); Sun, SX (Sun, Sixuan)

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摘要: Landslides are serious geohazards that occur under a variety of climatic conditions and can cause many casualties and significant economic losses. Centrifuge modelling, as a representative type of physical modelling, provides a realistic simulation of the stress level in a small-scale model and has been applied over the last 50 years to develop a better understanding of landslides. With recent developments in this technology, the application of centrifuge modelling in landslide science has significantly increased. Here, we present an overview of physical models that can capture landslide processes during centrifuge mod-elling. This review focuses on (i) the experimental principles and considerations, (ii) landslide models subjected to various triggering factors, including centrifugal acceleration, rainfall, earthquakes, water level changes, thawing permafrost, excavation, external loading and miscellaneous conditions, and (iii) different methods for mitigating landslides modelled in centrifuge, such as the application of nails, piles, geotextiles, vegetation, etc. The behaviors of all the centrifuge models are discussed, with emphasis on the deformation and failure mechanisms and experimental techniques. Based on this review, we provide a best-practice methodology for preparing a centrifuge landslide test and propose further efforts in terms of the seven aspects of model materials, testing design and equipment, measurement methods, scaling laws, full-scale test applications, landslide early warning, and 3D modelling to better understand the complex behaviour of landslides.(c) 2022 China University of Geosciences (Beijing) and Peking University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/ licenses/by-nc-nd/4.0/).

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标题: A Bifunctional CdS/MoO2/MoS2 Catalyst Enhances Photocatalytic H-2 Evolution and Pyruvic Acid Synthesis

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摘要: The best use of photogenerated electrons and holes is crucial to boosting photocatalytic activity. Herein, a bifunctional dual-cocatalyst-modified photocatalyst is constructed based on CdS/MoO2/MoS2 hollow spheres for hydrogen evolution coupled with selective pyruvic acid (PA) production from lactic acid (LA) oxidation. MoS2 and MoO2 are simultaneously obtained from the conversion of CdMoO4 in one step. In a photocatalytic process, the MoS2 and MoO2 function as the reduction and oxidation centers on which photogenerated electrons and holes accumulate and are used for hydrogen evolution reaction (HER) and PA synthesis, respectively. By monitoring the intermediates, a two-step single-electron route for PA production is proposed, initiated by the cleavage of the alpha-C(sp(3))-H bond in the LA. The conversion of LA and the selectivity of PA can reach ca. 29 % and 95 % after a five-hour reaction, respectively.

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第 9 条，共 21 条

标题: Effects of digital economy on carbon emission reduction: New evidence from China

作者: Yi, M (Yi, Ming); Liu, YF (Liu, Yafen); Sheng, MS (Sheng, Mingyue Selena); Wen, L (Wen, Le)

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摘要: Recently, the progress of reaching carbon emission peaks and achieving carbon neutrality has had significant impacts on the global economy. The overall societal efforts on carbon emission reduction from various industries will likely be strengthened, thanks to the advantages enterprises could gain in digital technologies through a structural upgrade in the energy systems. Based on China's provincial panel data from 2011 to 2019, this paper constructs a spatial panel Durbin model and a mediating effect model to investigate the mechanism and influence of the digital economy on carbon emission reduction. The results show that (1) the development of the digital economy has a significant spatial spillover effect on carbon emission reduction; (2) the digital economy in-fluences carbon emission reduction both directly and indirectly. This means that the carbon emission reduction can be affected indirectly by the digital economy through the transformation of energy structure; (3) the carbon emission reduction effect of the digital economy exhibits regional heterogeneity, it is more prominent in eastern regions than in other areas. The above findings provide substantial empirical evidence to policymakers on how to best promote the development of the digital economy and intensify the coordination of China's digital infra-structure in regional environmental governance.

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标题: Science Requirements and Detector Concepts for the Electron-Ion Collider

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摘要: This report describes the physics case, the resulting detector requirements, and the evolving detector concepts for the experimental program at the Electron-Ion Collider (EIC). The EIC will be a powerful new high-luminosity facility in the United States with the capability to collide high-energy electron beams with high-energy proton and ion beams, providing access to those regions in the nucleon and nuclei where their structure is dominated by gluons. Moreover, polarized beams in the EIC will give unprecedented access to the spatial and spin structure of the proton, neutron, and light ions. The studies leading to this document were commissioned and organized by the EIC User Group with the objective of advancing the state and detail of the physics program and developing detector concepts that meet the emerging requirements in preparation for the realization of the EIC. The effort aims to provide the basis for further development of concepts for experimental equipment best suited for the science needs, including the importance of two complementary detectors and interaction regions.

This report consists of three volumes. Volume I is an executive summary of our findings and developed concepts. In Volume II we describe studies of a wide range of physics measurements and the emerging requirements on detector acceptance and performance. Volume III discusses general-purpose detector concepts and the underlying technologies to meet the physics requirements. These considerations will form the basis for a world-class experimental program that aims to increase our understanding of the fundamental structure of all visible matter.

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输出日期: 2023-09-04

第 11 条，共 21 条

标题: Challenges for photocatalytic overall water splitting

作者: Bie, CB (Bie, Chuanbiao); Wang, LX (Wang, Linxi); Yu, JG (Yu, Jiaguo)

来源出版物: CHEM 卷: 8 期: 6 页: 1567-1574 DOI: 10.1016/j.chempr.2022.04.013 提前访问日期: JUN 2022 出版年: JUN 9 2022

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摘要: The hydrogen economy is a sunrise industry, which is considered the ultimate solution to power the future society. Photocatalytic overall water splitting is projected as a potential technology for H2 production. However, its performance is still far from meeting the criteria for large-scale production. This paper argues that photocatalytic overall water splitting is theoretically and practically hard to achieve. The limiting factors, including unfavorable thermodynamics, slow kinetics, dissolved oxygen, and rapid backward reaction, are discussed. This paper is expected to give readers a better understanding of the photocatalytic overall water splitting and analyze the associated challenges in every subtle aspect.

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第 12 条，共 21 条

标题: Non-Noble Plasmonic Metal-Based Photocatalysts

作者: Sayed, M (Sayed, Mahmoud); Yu, JG (Yu, Jiaguo); Liu, G (Liu, Gang); Jaroniec, M (Jaroniec, Mietek)

来源出版物: CHEMICAL REVIEWS 卷: 122 期: 11 页: 10484-10537 DOI: 10.1021/acs.chemrev.1c00473 出版年: JUN 8 2022

Web of Science 核心合集中的 "被引频次": 165

被引频次合计: 165

摘要: Solar-to-chemical energy conversion via heterogeneous photocatalysis is one of the sustainable approaches to tackle the growing environmental and energy challenges. Among various promising photocatalytic materials, plasmonic-driven photocatalysts feature prominent solar-driven surface plasmon resonance (SPR). Non-noble plasmonic metals (NNPMs)-based photocatalysts have been identified as a unique alternative to noble metal-based ones due to their advantages like earth-abundance, cost-effectiveness, and large-scale application capability. This review comprehensively summarizes the most recent advances in the synthesis, characterization, and properties of NNPMs-based photocatalysts. After introducing the fundamental principles of SPR, the attributes and functionalities of NNPMs in governing surface/interfacial photocatalytic processes are presented. Next, the utilization of NNPMs-based photocatalytic materials for the removal of pollutants, water splitting, CO2 reduction, and organic transformations is discussed. The review concludes with current challenges and perspectives in advancing the NNPMs-based photocatalysts, which are timely and important to plasmon-based photocatalysis, a truly interdisciplinary field across materials science, chemistry, and physics.

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第 13 条，共 21 条

标题: Digital economy and carbon emission performance: Evidence at China's city level

作者: Zhang, W (Zhang, Wei); Liu, XM (Liu, Xuemeng); Wang, D (Wang, Die); Zhou, JP (Zhou, Jianping)

来源出版物: ENERGY POLICY 卷: 165 文献号: 112927 DOI: 10.1016/j.enpol.2022.112927 提前访问日期: APR 2022 出版年: JUN 2022

Web of Science 核心合集中的 "被引频次": 132

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摘要: This paper discusses the effect and mechanisms of digital economy (diec) on carbon emission performance (cop). Specifically, based on the panel data of 277 cities in China from 2011 to 2019, carbon emission performance and digital economy at the city level were evaluated through global super efficiency Epsilon-Based Measure (EBM) with unexpected output, and the vertical and horizontal scatter degree method, respectively. The OLS, mediation effect model, threshold model and spatial Durbin model (SDM) were adopted to investigate the nexus of diec and cop. The results show that: First, digital economy improves carbon emission performance, and this conclusion holds even after a series of robustness tests and endogenous treatment. The main impact mechanisms are energy intensity (ei), energy consumption scale (ec) and urban afforestation. And the effect and its impact mechanisms show regional heterogeneity. Second, under different levels of energy consumption structure, ei, ec, government intervention and urban afforestation, the impact of diec on cop is non-linear. Third, there's a spatial effect between diec and cop. The impact of diec on cop is significantly positive in local cities, while insignificant in the neighboring cities. Based on the above conclusions, specific recommendations are proposed for diec to improve cop.

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ESI 高被引论文: Y

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输出日期: 2023-09-04

第 14 条，共 21 条

标题: Impact of Power on Uneven Development: Evaluating Built-Up Area Changes in Chengdu Based on NPP-VIIRS Images (2015-2019)

作者: Liu, L (Liu, Long); Li, ZC (Li, Zhichao); Fu, XY (Fu, Xinyi); Liu, X (Liu, Xuan); Li, ZH (Li, Zehao); Zheng, WF (Zheng, Wenfeng)

来源出版物: LAND 卷: 11 期: 4 文献号: 489 DOI: 10.3390/land11040489 出版年: APR 2022

Web of Science 核心合集中的 "被引频次": 77

被引频次合计: 77

摘要: In the context of uneven development studies of China, urban built-up area changes are the index of the impact of power, as the local government is the only party that is able to acquire agricultural land and convert it to construction urban land. Existing studies generally use statistical data to describe the built-up area changes and struggle to meet the requirement of an updated and inexpensive monitoring of uneven development, especially for western cities with tight budgets. Open access NPP-VIIRS (Suomi National Polar-orbiting Partnership Visible Infrared Imaging Radiometer Suite), NDVI (Normalized Difference Vegetation Index), and nighttime LST (Land Surface Temperature) data ranging from 2015 to 2019 were analyzed with a stratified SVM (Support Vector Machine) method in this study to track urban built-up area changes in Chengdu, one of the biggest cities in Western China. The SDE (Standard Deviation Ellipse) and Moran's I were then applied to evaluate the spatial variations of the built-up area changes. It was revealed that the spatial evolution of built-up area change in Chengdu over the period 2015-2019 demonstrated a "northwest-southeast" spatial expansion pattern, and the change distance in the center of gravity in 2018 and 2019 was greater than that from 2015 to 2017, which reflected the faster uneven development in 2018 and 2019 in Chengdu. The results were verified with finer resolution Landsat-8 OLI images; the high OA (all larger than 92%) and KAPPA (all larger than 0.6) values showed the accuracy of the method. The methodology proposed in this study offers a practical way for cities with tight budgets to monitor uneven development, and this study suggests a further adaption using higher-resolution remote sensing images and field experiments.

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第 15 条，共 21 条

标题: Emerging S-Scheme Photocatalyst

作者: Zhang, LY (Zhang, Liuyang); Zhang, JJ (Zhang, Jianjun); Yu, HG (Yu, Huogen); Yu, JG (Yu, Jiaguo)

来源出版物: ADVANCED MATERIALS 卷: 34 期: 11 文献号: 2107668 DOI: 10.1002/adma.202107668 提前访问日期: JAN 2022 出版年: MAR 2022

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摘要: Photocatalysis is a green technology to use ubiquitous and intermittent sunlight. The emerging S-scheme heterojunction has demonstrated its superiority in photocatalysis. This article covers the state-of-the-art progress and provides new insights into its general designing criteria. It starts with the challenges confronted by single photocatalyst from the perspective of energy dissipation by borrowing the common behaviors in the dye molecule. Subsequently, other problems faced by single photocatalyst are summarized. Then a viable solution for these problems is the construction of heterojunctions. To overcome the problems and mistakes of type-II and Z-scheme heterojunctions, S-scheme heterojunction is proposed and the underlying reaction mechanism is summarized. Afterward, the design principles for S-scheme heterojunction are proposed and four types of S-scheme heterojunctions are suggested. Following this, direct characterization techniques for testifying the charge transfer in S-scheme heterojunction are presented. Finally, different photocatalytic applications of S-scheme heterojunctions are summarized. Specifically, this work endeavors to clarify the critical understanding on curved Fermi level in S-scheme heterojunction interface, which can help strengthen and advance the fundamental theories of photocatalysis. Moreover, the current challenges and prospects of the S-scheme heterojunction photocatalyst are critically discussed.

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输出日期: 2023-09-04

第 16 条，共 21 条

标题: How does industrial structure adjustment reduce CO2 emissions? Spatial and mediation effects analysis for China

作者: Zhao, J (Zhao, Jun); Jiang, QZ (Jiang, Qingzhe); Dong, XC (Dong, Xiucheng); Dong, KY (Dong, Kangyin); Jiang, HD (Jiang, Hongdian)

来源出版物: ENERGY ECONOMICS 卷: 105 文献号: 105704 DOI: 10.1016/j.eneco.2021.105704 提前访问日期: JAN 2022 出版年: JAN 2022

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摘要: To accelerate industrial structure adjustment and effectively mitigate carbon dioxide (CO2) emissions, this study aims to investigate the carbon emission reduction effect of China's industrial structure adjustment. For this purpose, considering the potential spatial effect, the spatial econometric technique is utilized. Also, the industrial structure adjustment is divided into industrial structure upgrading and industrial structure optimization for heterogeneous analysis. Then, we empirically explore the mediating role of energy efficiency in the relationship between industrial structure adjustment and CO2 emissions in China. Three findings are drawn from the estimation results: (1) the index of industrial structure upgrading in China has gradually increased, while the index of industrial structure optimization has displayed a slightly downward trend; (2) industrial structure upgrading shows a significant spatial negative correlation with CO2 emissions, while industrial structure optimization affects CO2 emissions positively; and (3) industrial structure upgrading can reduce CO2 emissions by improving energy efficiency, and industrial structure optimization can exacerbate the greenhouse effect by impeding energy efficiency improvements. Based on these findings, we make several policy suggestions for mitigating CO2 emissions and promoting industrial structure adjustment in China.

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第 17 条，共 21 条

标题: Hierarchically Porous ZnO/g-C3N4S-Scheme Heterojunction Photocatalyst for Efficient H2O2 Production

作者: Liu, BW (Liu, Bowen); Bie, CB (Bie, Chuanbiao); Zhang, Y (Zhang, Yong); Wang, LX (Wang, Linxi); Li, YJ (Li, Youji); Yu, JG (Yu, Jiaguo)

来源出版物: LANGMUIR 卷: 37 期: 48 页: 14114-14124 DOI: 10.1021/acs.langmuir.1c02360 出版年: DEC 7 2021

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摘要: The design of photocatalysts with hierarchical pore sizes is an effective method to improve mass transport, enhance light absorption, and increase specific surface area. Moreover, the construction of a heterojunction at the interface of two semiconductor photocatalysts with suitable band positions plays a crucial role in separating and transporting charge carriers. Herein, ZIF-8 and urea are used as precursors to prepare hierarchically porous ZnO/g-C3N4 S-scheme heterojunction photocatalysts through a two-step calcination method. This S-scheme hetero- junction photocatalyst shows high activity toward photocatalytic H2O2 production, which is 3.4 and 5.0 times higher than that of pure g-C3N4 and ZnO, respectively. The mechanism of charge transfer and separation within the S-scheme heterojunction is studied by Kelvin probe, in situ irradiated X-ray photoelectron spectroscopy (ISI-XPS), and electron paramagnetic resonance (EPR). This research provides an idea of designing S-scheme heterojunction photocatalysts with hierarchical pores in efficient photocatalytic hydrogen peroxide production.

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第 18 条，共 21 条

标题: Deep learning for geological hazards analysis: Data, models, applications, and opportunities

作者: Ma, ZJ (Ma, Zhengjing); Mei, G (Mei, Gang)

来源出版物: EARTH-SCIENCE REVIEWS 卷: 223 文献号: 103858 DOI: 10.1016/j.earscirev.2021.103858 提前访问日期: NOV 2021 出版年: DEC 2021

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摘要: As natural disasters are induced by geodynamic activities or abnormal changes in the environment, geological hazards tend to wreak havoc on the environment and human society. Recently, the dramatic increase in the volume of various types of Earth observation 'big data' from multiple sources, and the rapid development of deep learning as a state-of-the-art data analysis tool, have enabled novel advances in geological hazard analysis, with the ultimate aim to mitigate the devastation associated with these hazards. Motivated by numerous applications, this paper presents an overview of the advances in the utilization of deep learning for geological hazard analysis. First, six commonly available Earth observation data sources are described, e.g., unmanned aerial vehicles, satellite platforms, and in-situ monitoring systems. Second, the deep learning background and six typical deep learning models are introduced, such as convolutional neural networks and recurrent neural networks. Third, focusing on six typical geological hazards, i.e., landslides, debris flows, rockfalls, avalanches, earthquakes, and volcanoes, the deep learning applications for geological hazard analysis are reviewed, and common application paradigms are summarized. Finally, the challenges and opportunities for the application of deep learning models for geological hazard analysis are highlighted, with the aim to inspire further related research.

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第 19 条，共 21 条

标题: Central China Orogenic Belt and amalgamation of East Asian continents

作者: Dong, YP (Dong, Yunpeng); Sun, SS (Sun, Shengsi); Santosh, M (Santosh, M.); Zhao, J (Zhao, Jie); Sun, JP (Sun, Jiaopeng); He, DF (He, Dengfeng); Shi, XH (Shi, Xiaohui); Hui, B (Hui, Bo); Cheng, C (Cheng, Chao); Zhang, GW (Zhang, Guowei)

来源出版物: GONDWANA RESEARCH 卷: 100 特刊: SI 页: 131-194 DOI: 10.1016/j.gr.2021.03.006 提前访问日期: NOV 2021 出版年: DEC 2021

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摘要: The Central China Orogenic Belt (CCOB) comprises, from the east to the west, the Tongbai-Dabie, Qinling, Qilian and Kunlun Orogens, and preserves abundant and important amalgamation records of the North China, South China, Qaidam, Tarim and Qiangtang Blocks. The CCOB offers an excellent window to the tectonic evolution from Proto-Tethys to Paleo-Tethys domains and the formation of East Asian continent. In this Centennial Review of Gondwana Research, we assemble comprehensive and multidisciplinary information of geological, geochemical, geophysical and high-precision geochronological dataset from individual orogens of the CCOB, together with a synthesis of Paleomagnetic data, to gain insights on the tectonic framework and evolutionary history of CCOB. The detailed and highly-integrated analysis leads to the following major conclusions. (1) Prior to ca. 550 Ma, break-up of the Rodinia supercontinent led to the formation of Proto-Tethys Ocean, wherein the above crustal blocks were isolated discrete units. (2) During ca. 541-485 Ma, spreading of all the embranchments of the Proto-Tethys Ocean at the early stage and the onset of subduction at the late stage. (3) Up to ca. 485-444 Ma, continued subduction of the Proto-Tethys Oceans resulted in opening and closing of the back-arc basin in the Qinling area. (4) During ca. 444-420 Ma, the Proto-Tethys Oceans along the Qilian and Shangdan were closing. (5) During ca. 420-300 Ma, the Paleo-Tethys Ocean in the Kunlun area inherited the Proto-Tethys Ocean, while the Paleo-Tethyan Mianlue Ocean experienced spreading. (6) At ca. 300-250 Ma, subduction retreat of the Kunlun Ocean occurred from the Aqikekulehu-Kunzhong suture to the Muztagh-Buqingshan-Anemaqen suture. (7) The Paleo-Tethys Ocean underwent eastward diachronous closing processes throughout the Kunlun to Qinling and Dabie areas during ca. 250-200 Ma; (8) The entire CCOB range has evolved into intracontinental deformation since 200 Ma. (c) 2021 International Association for Gondwana Research Published by Elsevier B.V. All rights reserved.

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输出日期: 2023-09-04

第 20 条，共 21 条

标题: In situ Irradiated XPS Investigation on S-Scheme TiO2@ZnIn2S4 Photocatalyst for Efficient Photocatalytic CO2 Reduction

作者: Wang, LB (Wang, Libo); Cheng, B (Cheng, Bei); Zhang, LY (Zhang, Liuyang); Yu, JG (Yu, Jiaguo)

来源出版物: SMALL 卷: 17 期: 41 文献号: 2103447 DOI: 10.1002/smll.202103447 提前访问日期: SEP 2021 出版年: OCT 2021

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摘要: Reasonable design of efficient hierarchical photocatalysts has gained significant attention. Herein, a step-scheme (S-scheme) core-shell TiO2@ZnIn2S4 heterojunction is designed for photocatalytic CO2 reduction. The optimized sample exhibits much higher CO2 photoreduction conversion rates (the sum yield of CO, CH3OH, and CH4) than the blank control, i.e., ZnIn2S4 and TiO2. The improved photocatalytic performance can be attributed to the inhibited recombination of photogenerated charge carriers induced by S-scheme heterojunction. The improvement is also attributed to the large specific surface areas and abundant active sites. Meanwhile, S-scheme photogenerated charge transfer mechanism is testified by in situ irradiated X-ray photoelectron spectroscopy, work function calculation, and electron paramagnetic resonance measurements. This work provides an effective strategy for designing highly efficient heterojunction photocatalysts for conversion of solar fuels.

入藏号: WOS:000694986000001

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第 21 条，共 21 条

标题: Pt/Fe2O3 with Pt-Fe pair sites as a catalyst for oxygen reduction with ultralow Pt loading

作者: Gao, RJ (Gao, Ruijie); Wang, J (Wang, Jian); Huang, ZF (Huang, Zhen-Feng); Zhang, RR (Zhang, Rongrong); Wang, W (Wang, Wei); Pan, L (Pan, Lun); Zhang, JF (Zhang, Junfeng); Zhu, WK (Zhu, Weikang); Zhang, XW (Zhang, Xiangwen); Shi, CX (Shi, Chengxiang); Lim, J (Lim, Jongwoo); Zou, JJ (Zou, Ji-Jun)

来源出版物: NATURE ENERGY 卷: 6 期: 6 页: 614-623 DOI: 10.1038/s41560-021-00826-5 提前访问日期: MAY 2021 出版年: JUN 2021

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摘要: Atomically dispersed platinum electrocatalysts for oxygen reduction promise minimized platinum usage, but catalytic activity and selectivity are often low due to unfavourable O-2 adsorption. To circumvent this issue, Gao and colleagues load platinum onto alpha-Fe2O3, making a highly active and stable catalyst with dispersed Pt-Fe pair sites.

Platinum is the archetypal electrocatalyst for oxygen reduction-a key reaction in fuel cells and zinc-air batteries. Although dispersing platinum as single atoms on a support is a promising way to minimize the amount required, catalytic activity and selectivity are often low due to unfavourable O-2 adsorption. Here we load platinum onto alpha-Fe2O3 to construct a highly active and stable catalyst with dispersed Pt-Fe pair sites. We propose that the Pt-Fe pair sites have partially occupied orbitals driven by strong electronic coupling, and can cooperatively adsorb O-2 and dissociate the O=O bond, whereas OH\* can desorb from the platinum site. In alkaline conditions, the catalyst exhibits onset and half-wave potentials of 1.15 V and 1.05 V (versus the reversible hydrogen electrode), respectively, mass activity of 14.9 A mg(Pt)(-1) (at 0.95 V) and negligible activity decay after 50,000 cycles. It also shows better performance than 20% Pt/C in a zinc-air battery and H-2-O-2 fuel cell in terms of specific energy density and platinum utilization efficiency.

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