



Front Cover

Few-layered hexagonal boron nitride nanosheets stabilized Pt NPs for oxidation promoted adsorptive desulfurization of fuel oil

Peiwen Wu, Xin Song, Linlin Chen, Lianwen He, Yingcheng Wu, Duanjian Tao, Jing He, Chang Deng, Linjie Lu, Yanhong Chao, Mingqing Hua, Wenshui Zhu**

CONTENTS

Research Highlight

Direct capture and separation of CO₂ from air

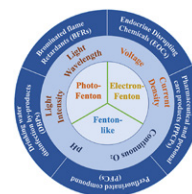
Siew Ping Teong, Yugen Zhang* 413

Review articles

Oxidation of emerging organic contaminants by in-situ H₂O₂ fenton system

Yuqin Ni, Chuxiang Zhou, Mingyang Xing*, Yi Zhou* 417

This paper provides a comprehensive overview of mechanism, influencing factors, characteristics of different systems, and development prospects of in-situ H₂O₂ Fenton oxidation system in the removal of emerging organic contaminants.



Critical approaches in the catalytic transformation of sugar isomerization and epimerization after Fischer – History, challenges, and prospects

Da-Ming Gao¹, Xun Zhang¹, Haichao Liu*, Hidemi Fujino, Tingzhou Lei, Fuan Sun, Jie Zhu*, Taoli Huhe* 435

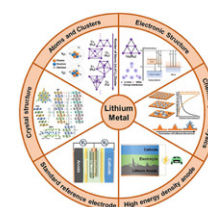
In this review, we trace the history of sugar isomerization/epimerization reactions and summarize the important breakthroughs for each reaction as well as the difficulties that remain unresolved to date.



Perception of fundamental science to boost lithium metal anodes toward practical application

Jinkun Wang, Li Wang, Hong Xu, Li Sheng, Xiangming He* 454

This review revisits the fundamental science of lithium with emphasis on the nature of lithium in different forms, endeavoring to pave the way and stimulate new ideas for the practical application of lithium metal anodes.

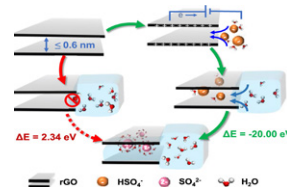


Research papers

Wetting sub-nanochannels via ionic hydration effect for improving charging dynamics

Yayun Shi¹, Xiaoli Zhao¹, Qihang Liu, Zhenghui Pan, Congcong Liu, Shanyi Zhu, Zhijun Zuo*, Xiaowei Yang*..... 473

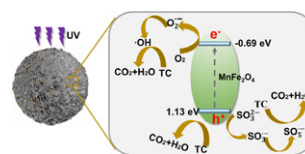
The ionic hydration effect is employed to achieve the wetting of sub-nanochannels, leading to the increased ion diffusion coefficient by ~9.4 times. Both the water stability in the ionic pre-intercalation and water affinity is determined by the water-ions interaction.



Photocatalytic activation of sulfite by N-doped porous biochar/MnFe₂O₄ interface-driven catalyst for efficient degradation of tetracycline

Long Cheng, Yuanhui Ji*..... 481

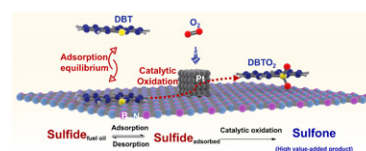
The N-doped biochar matrix loaded with MnFe₂O₄ was prepared through a simple hydrothermal method, and was applied to remove tetracycline (TC) simultaneously with the synergy of adsorption and photocatalysis.



Few-layered hexagonal boron nitride nanosheets stabilized Pt NPs for oxidation promoted adsorptive desulfurization of fuel oil

Peiwen Wu, Xin Song, Linlin Chen, Lianwen He, Yingcheng Wu, Duanjian Tao, Jing He, Chang Deng, Linjie Lu, Yanhong Chao, Mingqing Hua*, Wenshuai Zhu*..... 495

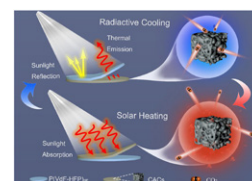
A few-layered hexagonal boron nitride nanosheets stabilized platinum nanoparticles (Pt/h-BNNS) is engineered for oxidation-promoted adsorptive desulfurization (OPADS) of fuel oil. The strong interactions between Pt NPs and h-BNNS induce deep desulfurization of fuel oil.



Low-energy-consumption temperature swing system for CO₂ capture by combining passive radiative cooling and solar heating

Ying-Xi Dang, Peng Tan*, Bin Hu, Chen Gu, Xiao-Qin Liu, Lin-Bing Sun*..... 507

Temperature swing system with radiative cooling and solar heating is developed for energy-efficient CO₂ adsorption. The work may inspire the development of new temperature swing procedures with little energy consumption.

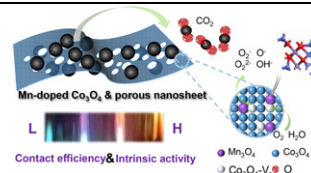


Facile preparation and efficient Mn_xCo_y porous nanosheets for the sustainable catalytic process of soot

Miaomiao Hu¹, Kun Zhou¹, Tingyi Zhao, Zheng Li, Xianhai Zeng*, Di Yu, Xuehua Yu*, Mingqin Zhao, Zhihui Shao, Qixiang Xu, Bing Cui*..... 516

Green Energy & Environment

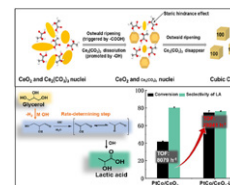
Mn_xCo_y catalysts were synthesized using a simple MgO-template substitution method. Specifically, the doping of Mn enhances the contact efficiency and intrinsic activity, resulting in excellent catalytic performance in soot combustion.



Synthesizing active and durable cubic ceria catalysts (<6 nm) for fast dehydrogenation of bio-polyols to carboxylic acids coproducing green H₂

Mengyuan Liu, Puhua Sun, Guangyu Zhang*, Xin Jin*, Chaohe Yang*, Honghong Shan..... 529

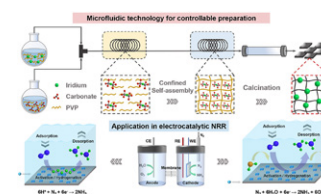
Cubic CeO₂ supported PtCo catalysts, synthesized by LA-assisted method, exhibit a record high activity (TOF: 29,241 h⁻¹) and Vö-dependent synergism for C–H bond activation of glycerol at 200 °C.



Microfluidic-oriented synthesis of enriched iridium nanodots/carbon architecture for robust electrocatalytic nitrogen fixation

Hengyuan Liu, Xingjiang Wu, Yuhao Geng, Xin Li, Jianhong Xu*..... 544

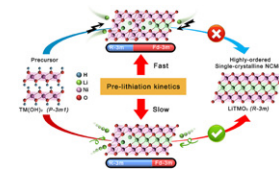
In this work, the microfluidic technology is developed to in-situ fabricate enriched iridium nanodots/carbon architecture as promising electrode materials for electrocatalytic NRR with high ammonia yield and faradic efficiency in acidic and alkaline conditions.



New insights into the pre-lithiation kinetics of single-crystalline Ni-rich cathodes for long-life Li-ion batteries

Qiang Han, Lele Cai, Zhaofeng Yang, Yanjie Hu, Hao Jiang*, Chunzhong Li*..... 556

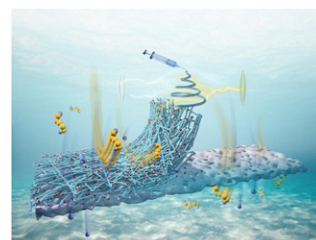
The slow pre-lithiation kinetics is preferred to the fast one because it can effectively promote the transformation of intermediate to highly-ordered layered Ni-rich cathode by improving the proportion of the layered phase in the intermediate.



Grapevine-like high entropy oxide composites boost high-performance lithium sulfur batteries as bifunctional interlayers

Huarong Fan¹, Yubing Si¹, Yiming Zhang, Fulong Zhu, Xin Wang*, Yongzhu Fu*..... 565

The self-supporting high-entropy metal oxides grown on carbon nanofibers as an interlayer are prepared by an electrospinning method. It considerably relieves the shuttle effect of lithium polysulfides and enhances the electrochemical performance of lithium sulfur batteries through the simultaneous impacts of hierarchical physical sieve and high-entropy induced chemisorption.

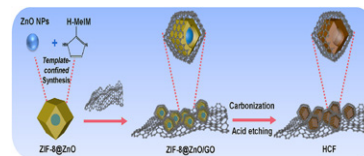


Carbon nanocages bridged with graphene enable fast kinetics for dual-carbon lithium-ion capacitors

Green Energy & Environment

Shani Li, Yanan Xu, Wenhao Liu, Xudong Zhang, Yibo Ma, Qifan Peng, Xiong Zhang, Xianzhong Sun, Kai Wang*, Yanwei Ma* 573

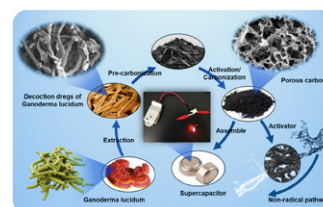
This study presents an effective strategy to promote LIC anode kinetics, by designing an N-doped hierarchical carbon framework (HCF) material, which is composed of 0D carbon nanocages bridged with 2D graphene network. LIC pouch-cell based on HCF anode and active HCF (a-HCF) cathode can provide high energy density and superior power density, as well as remarkable cycling life.



Self-templating synthesis of biomass-based porous carbon nanotubes for energy storage and catalytic degradation applications

Manman Xu, Shiqi Fu, Yukai Wen, Wei Li, Qiongfang Zhuo, Haida Zhu, Zhikeng Zheng, Yuwen Chen, Anqi Wang*, Kai Yan* 584

Self-template waste Ganoderma lucidum residue-derived carbon nanotubes (ST-DDLGCs) with hierarchical porous structures were synthesized. ST-DDLGCs exhibited significant capacity for PMS activation and superior performance as supercapacitor electrodes. The mechanisms of catalytic oxidation and charge storage was clarified.



Corrigendum

Corrigendum to 'Increasing the greenness of an organic acid through deep eutectic solvation and further polymerisation'

Liteng Li, Xiaofang Li, Susu Zhang, Hongyuan Yan, Xiaoqiang Qiao, Hongyan He*, Tao Zhu*, Baokun Tang* 596