



Front Cover

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Chongxiong Duan, Yi Yu*, Han Hu*..... 3

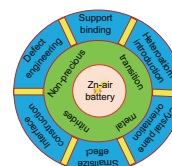
In this review, we discuss various strategies for the preparation of ZIF-67-based materials including the solvothermal method, surfactant-assisted method, sol-gel method, and microwave/ultrasound-assisted method. We also discuss the applications of ZIF-67-based materials in heterogeneous catalysis fields including the redox reactions, addition reactions, esterifications, Knoevenagel condensations, and hydrogenation-dehydrogenation reactions.



Regulating non-precious transition metal nitrides bifunctional electrocatalysts through surface/interface nanoengineering for air-cathodes of Zn-air batteries

Qixing Du, Yanmei Gong, Muhammad Arif Khan, Daixin Ye*, Jianhui Fang*, Hongbin Zhao*, Jiuju Zhang..... 16

This review summarizes the progress of transition metal nitrides modified by surface/interface nanoengineering strategies such as defect engineering, support binding and heteroatom introduction as air-cathodes catalysts for Zn-air batteries.

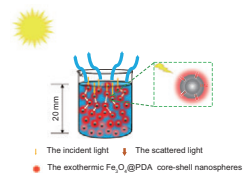


Research papers

Recyclable Fe₃O₄@Polydopamine (PDA) nanofluids for highly efficient solar evaporation

Qingmiao Wang, Yi Qin, Feifei Jia*, Shaoxian Song, Yanmei Li*..... 35

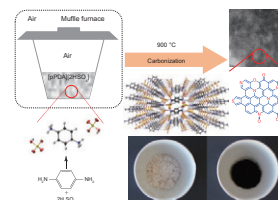
The recyclable $\text{Fe}_3\text{O}_4@\text{PDA}$ nanofluids were used as solar absorbers in volumetric evaporation system, and high evaporation efficiencies of 69.93%–85.47% and the high unit evaporation rates of $2.004\text{--}2.435 \text{ m}^3 (\text{kW h})^{-1}$ were achieved.



Semi-closed synthesis of nitrogen and oxygen Co-doped mesoporous carbon for selective aqueous oxidation

Chen Xing, Daihui Yang, Yan Zhang*, Tian Sun, Junfei Duan, Hussein A. Younus, Shiguo Zhang*... 43

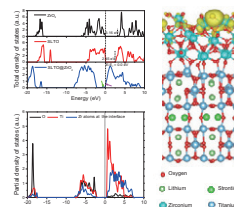
Without any inert gas protection, highly porous NOMCs are facily obtained by direct and template-free carbonization of a single precursor in a muffle furnace under air atmosphere, which can be used as efficient catalysts for selective aqueous oxidation of alcohols.



Improving the stability, lithium diffusion dynamics, and specific capacity of $\text{SrLi}_2\text{Ti}_6\text{O}_{14}$ via ZrO_2 coating

Hong-Li Ding, Hai-Tao Yu, Xiao-dong Wang*, Chen-Feng Guo, Bing Zheng, Ying Xie*, Ting-Feng Yi*..... 53

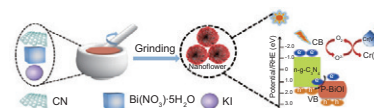
A stable ZrO_2 layer was successfully coated on $\text{SrLi}_2\text{Ti}_6\text{O}_{14}$ surface through Ti–O/Zr–O covalent bonds. The covalent coating leads to a metallic surface state and avoid direct contact between $\text{SrLi}_2\text{Ti}_6\text{O}_{14}$ and electrolyte, responsible for the obvious improvement of the performance.



Room-temperature solid phase surface engineering of BiOI sheets stacking g- C_3N_4 boosts photocatalytic reduction of Cr(VI)

Xin Zhang, Weiwei Yang*, Manyi Gao, Hu Liu*, Kefei Li, Yongsheng Yu*..... 66

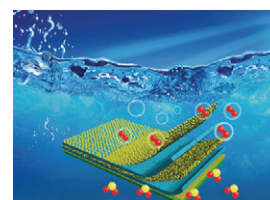
The direct BiOI/g- C_3N_4 Z-scheme heterojunction, in which BiOI was in-situ grown on the surface of g- C_3N_4 , was fabricated by solid phase engineer method, and it could remove Cr(VI) from aqueous solutions with high efficiency.



High performance of multi-layered alternating Ni–Fe–P and Co–P films for hydrogen evolution

Zunhang Lv, Kaihang Wang, Yingying Si, Zihan Li, Tianpeng Yu, Xin Liu, Guixue Wang, Guangwen Xie*, Luhua Jiang*..... 75

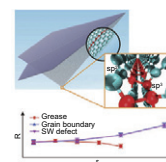
This work successfully performs the interface engineering by alternately depositing Co–P and Ni–Fe–P films on nickel foam, via facile electroless plating and de-alloying process. The as-prepared Co–P/Ni–Fe–P/NF electrode shows various structures in different layers and exhibits enhanced HER performance.



Unusual thermal properties of graphene origami crease: A molecular dynamics study

Ning Wei*, Yang Chen, Kun Cai, Yingyan Zhang, Qingxiang Pei, Jin-Cheng Zheng, Yiu-Wing Mai, Junhua Zhao*..... 86

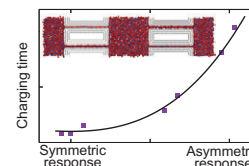
Herein, we report the unusual thermal properties of graphene origami crease: the interfacial thermal resistance (R) of the creased interface is reduced by external tensile strain (ϵ).



Symmetrizing cathode-anode response to speed up charging of nanoporous supercapacitors

Tangming Mo, Liang Zeng, Zhenxiang Wang, Svyatoslav Kondrat, Guang Feng*..... 95

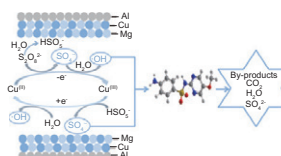
Constant-potential molecular dynamics simulations of symmetric and asymmetric nanoporous supercapacitors reveal that the symmetric response of ions in the cathode and anode can boost power density.



Heterogeneous activation of persulfate by CuMgAl layered double oxide for catalytic degradation of sulfameter

Hongmin Zhang, Qingzhu Jia*, Fangyou Yan*, Qiang Wang..... 105

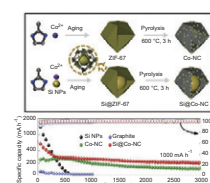
CuMgAl-LDO/PS system exhibited an excellent catalytic performance for the degradation of SMD with low leaching of copper ion and high reusability, and activation of PS mechanism through electron transfer as Cu(II)–Cu(III)–Cu(II) was proposed.



High-performance Si-Containing anode materials in lithium-ion batteries: A superstructure of Si@Co-NC composite works effectively

Qiongguang Li, Yanhong Wang*, Jing Yu, Menglei Yuan, Qiangqiang Tan, Ziyi Zhong*, Fabing Su*..... 116

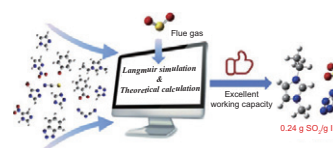
In this work, we design and prepare hollow core-shell structured Si@Co-NC composite and promote its electrochemical performance via confinement effect and work function regulation.



Design and prediction for highly efficient SO₂ capture from flue gas by imidazolium ionic liquids

Lili Jiang, Ke Mei, Kaihong Chen, Rina Dao, Haoran Li, Congmin Wang*..... 130

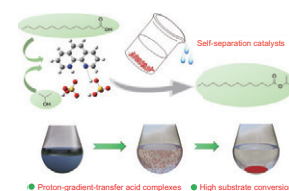
On the basis of quantitative calculations through a combination of Langmuir simulation, theoretical calculation and quantum chemical method, SO₂ absorption and desorption performance from flue gas by twelve kinds of imidazolium ionic liquids with different anions were designed and predicted. An ideal ionic liquid [Emim][Tetz] was obtained through the predictive method for the capture of SO₂ of 2000 ppm, which shows the highest available absorption capacity.



A novel proton-gradient-transfer acid complexes as an efficient and reusable catalyst for fatty acid esterification

Xiaomin Zhang, Wenjie Xiong, Zengyu Yin, Yongle Chen, Youting Wu*, Xingbang Hu* 137

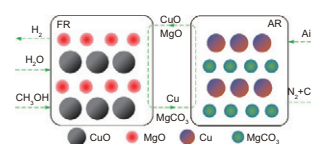
A novel series of proton-gradient-transfer acid complexes (PGTACs) were developed for esterification reaction. These catalysts work well resulting from the advantages of strong acids (high catalytic activity) and ionic liquids (phase separation). Moreover, they can be functionalized as reaction-induced self-separation catalyst by simple decantation to regenerate.



Sorption-enhanced chemical looping oxidative steam reforming of methanol for on-board hydrogen supply

Liang Zeng, Di Wei, Sam Toan, Zhao Sun*, Zhiqiang Sun..... 145

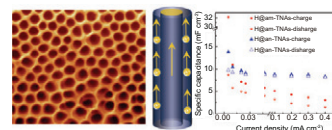
Schematic illustration of Sorption-enhanced chemical looping oxidative steam methanol reforming (SECL-OSMR) for high-purity hydrogen generation with ultra-low-concentration CO production. The process would be a potential method for on-board hydrogen supply.



The storage mechanism difference between amorphous and anatase as supercapacitors

Wanggang Zhang¹, Yiming Liu^{1*}, Zhiyuan Song, Changwan Zhuang, Aili Wei..... 156

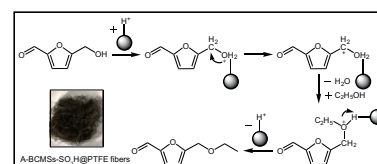
In addition to the crystal differences, the mesopores ~2 nm exist in the amorphous TNAs are the main reason for the electrochemical performance, since at relatively high current density, these mesopores will “block” the transport of the Na⁺.



Fabrication of supported acid catalytic composite fibers by a simple and low-cost method and their application on the synthesis of liquid biofuel 5-ethoxymethylfurfural

Yinhua Yan, Huiqin Guo, Kexin Li*, Liushui Yan*..... 165

A-BCMSs-SO₃H@PTFE fibers were successfully fabricated by a simple method using low-cost raw materials. As a heterogeneous solid acid catalyst that can be easily separated and reused, the as-prepared A-BCMSs-SO₃H@PTFE fibers can be used in the synthesis of EMF from HMF.



Formic acid fractionation towards highly efficient cellulose-derived PdAg bimetallic catalyst for H₂ evolution

Yanyan Yu, Huanghui Xu¹, Hongfei Yu¹, Lihong Hu, Yun Liu*..... 172

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Cellulose-derived PdAg bimetallic core-shell-like catalyst with efficient performance and satisfactory re-usability was synthesized for H₂ generation from sodium formate-free formic acid solution. The turnover frequency (TOF) of catalyst reaches a high value of 2875 h⁻¹.

