



Front Cover

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Back Cover

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Research highlight

Investigating ionic liquids for optimizing lithium metal anode

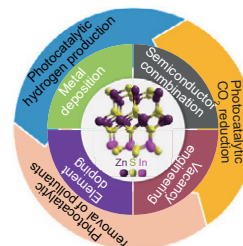
Lei Zhang..... 173

Review articles

A mini-review on ZnIn₂S₄-Based photocatalysts for energy and environmental application

Guping Zhang, Hao Wu, Dongyun Chen*, Najun Li, Qingfeng Xu, Hua Li, Jinghui He, Jianmei Lu*..... 176

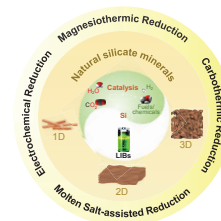
This mini-review highlighted the recent progress concerning the ZnIn₂S₄ photocatalysts with different nanostructure morphologies, various modification strategies and representative applications in the field of solar energy conversion and environmental remediation.



Advanced silicon nanostructures derived from natural silicate minerals for energy storage and conversion

Hao Wan, Wei Ma*, Kechao Zhou, Yijun Cao*, Xiaohe Liu*, Renzhi Ma..... 205

Progress in developing advanced Si materials from natural silicate minerals with regular nanoscale/microscale arrangements for clean energy storage and conversion is reviewed.

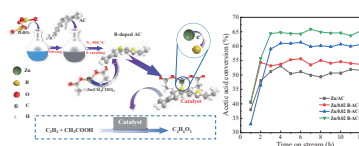


Research papers

B-doped activated carbon as a support for a high-performance Zn-based catalyst in acetylene acetoxylation

Fulong Zhu, Mingyuan Zhu*, Lihua Kang*..... 221

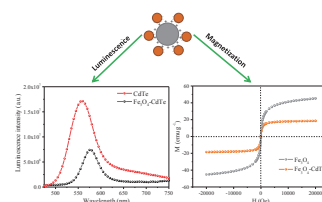
B-AC was used as support of Zn catalyst for acetylene acetoxylation. The introduction of boron transformed the electron cloud density of Zn, enhanced the adsorption of CH₃COOH and reduced the adsorption of C₂H₂, thus increased the conversion rate of CH₃COOH.



High recycling Fe₃O₄-CdTe nanocomposites for the detection of organophosphorothioate pesticide chlorpyrifos

Yanxue Guo, Hui Liu, Dong Chen, Jianglan Qu*, Jun Yang* 229

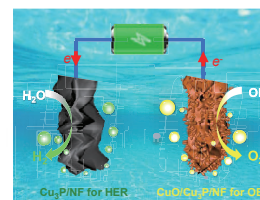
A strategy based on electrostatic interaction was developed to assemble magnetic Fe₃O₄ nanoparticles and luminescent CdTe quantum dots into a composite nanosystem, which simultaneously possesses magnetic and luminescent properties, for the detection of chlorpyrifos, one of the typical organophosphorothioate pesticides.



Hierarchical Cu₃P-based nanoarrays on nickel foam as efficient electrocatalysts for overall water splitting

Zhuojun Yang¹, Yongxiao Tuo^{1*}, Qing Lu, Chen Chen, Mengshan Liu, Bingyan Liu, Xuezhi Duan, Yan Zhou, Jun Zhang* 236

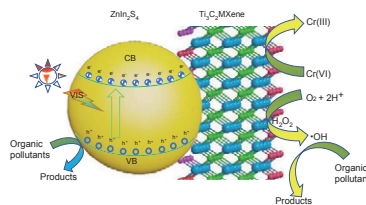
Hierarchical nanostructured Cu₃P nanoarrays were grown on nickel foam using a template-directed synthesis strategy and applied as efficient bifunctional electrodes for both OER and HER, which needs a small overpotential of ~331 mV at 50 mA cm⁻² for OER, and an overpotential of ~115 mV at 10 mA cm⁻² for HER.



Constructing Ti₃C₂ MXene/ZnIn₂S₄ heterostructure as a Schottky Catalyst for photocatalytic environmental remediation

Sijian Li, Luhua Shao, Zhenfei Yang, Shu Cheng, Cong Yang, Yutang Liu, Xinnian Xia* 246

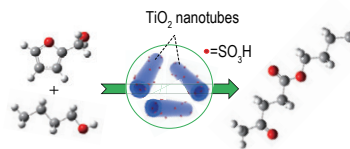
An interfacial contact Ti₃C₂ MXene/ZnIn₂S₄ nanosheets Schottky heterostructure for enhancing photocatalytic environment remediation, in which ZnIn₂S₄ nanosheets was in-situ grown on the surface of Ti₃C₂ MXene, was constructed by simple low temperature hydrothermal method.



Selective conversion of biomass-derived furfuryl alcohol into n-butyl levulinate over sulfonic acid functionalized TiO₂ nanotubes

Shuolin Zhou¹, Jinhua Lai¹, Xianxiang Liu*, Geng Huang, Gaolin You, Qiong Xu, Dulin Yin* 257

Sulfonic acid functionalized titanate nanotubes were prepared by the sulphonation reaction of hydrothermally synthesized TiO₂ nanotubes. The as-prepared catalysts exhibited the high activities in selective conversion of furfuryl alcohol into n-butyl levulinate.

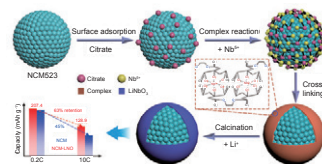


Lithium-conductive LiNbO₃ coated high-voltage LiNi_{0.5}Co_{0.2}Mn_{0.3}O₂ cathode with enhanced rate and cyclability

Haifeng Yu¹, Shouliang Wang, Yanjie Hu, Guanjie He, Le Quoc Bao, Ivan P. Parkin, Hao Jiang* 266

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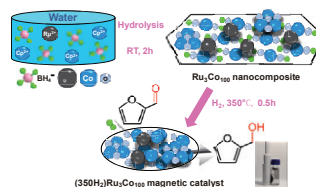
We develop a citrate-assisted deposition concept to achieve a uniform lithium-conductive LiNbO_3 coating layer on the NCM523 surface. Therefore, the capacity retention at 10 C have been improved from 45% to 63% relative to 0.2 C.



Efficient hydrogenation of furfural to furfuryl alcohol by magnetically recoverable RuCo bimetallic catalyst

Yongxing Wang, Tianyu Gao, Yaowei Lu, Yinghao Wang, Qiue Cao, Wenhao Fang* 275

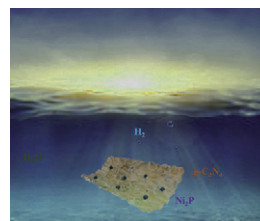
Simple hydrolysis and H_2 -reduction of Ru and Co precursors allows constructing the magnetic RuCo alloy active sites with strong metal interaction for efficient catalytic hydrogenation of furfural to furfuryl alcohol under H_2 atmosphere.



High-gravity-assisted engineering of $\text{Ni}_2\text{P}/\text{g-C}_3\text{N}_4$ nanocomposites with enhanced photocatalytic performance

Zhijian Zhao, Dan Wang*, Yuan Pu, Jiexin Wang, Liangliang Zhang*, Jianfeng Chen..... 288

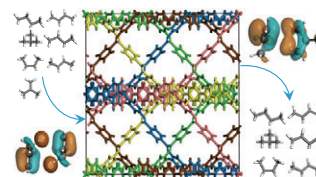
The Ni_2P loaded $\text{g-C}_3\text{N}_4$ photocatalyst was synthesized by liquid exfoliation coupled with high-gravity-driven process intensification technology, the intact interfacial structure and optimized band gap endowed the catalyst with boost hydrogen evolution efficiency under visible light.



Covalent organic framework shows high isobutene adsorption selectivity from C_4 hydrocarbons: Mechanism of interpenetration isomerism and pedal motion

Wei Chen, Mian Li, Wen-Li Peng, Ling Huang, Chao Zhao, Acharya Dinesh, Wentao Liu, Anmin Zheng*..... 296

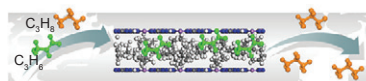
The gas adsorption/separation of covalent organic framework (COF) can be controlled by topology characteristics. A series of COFs with the diamond topology were screened for the selective adsorption of isobutene from other C_4 hydrocarbons *via* interpenetration, pedal motion and group substitution.



Selective adsorption of propene over propane on Li-decorated poly (triazine imide)

Yong Wang¹, Xiaoxia Jia¹, Libo Li*, Jiangfeng Yang, Jinping Li* 307

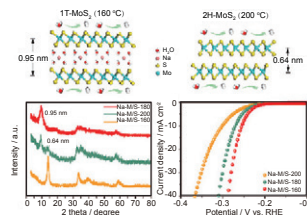
Coordinatively unsaturated metal sites (CUS) plays a dominating role in preferential adsorption of olefins over paraffins. Poly (triazine imide) (PTI) nanosheets can reach rapid gas adsorption equilibrium, due to its large surface-to-volume ratio. Combining the advantages of the CUS and the PTI nanosheets, we computationally demonstrate that the Li CUS–PTI complexes with slit pore architecture are potentially useful for $\text{C}_3\text{H}_6/\text{C}_3\text{H}_8$ adsorption separation.



Controllable fabrication and structure evolution of hierarchical 1T-MoS₂ nanospheres for efficient hydrogen evolution

Huanran Li¹, Xiaobo Han¹, Suyu Jiang, Lili Zhang, Wei Ma*, Renzhi Ma, Zhen Zhou* 314

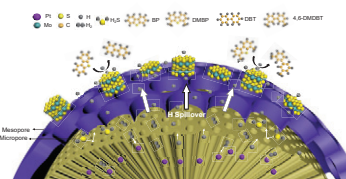
Hierarchical 1T-MoS₂ nanospheres fabricated via a phase evolution process accelerates the hydrogen generation resulting from the enhanced conductivity and expanded interlayer spacing with a comparable overpotential and a remarkably small Tafel slope.



Pt-confinement catalyst with dendritic hierarchical pores on excellent sulfur-resistance for hydrodesulfurization of dibenzothiophene and 4,6-dimethyldibenzothiophene

Xilong Wang, Chengkun Xiao, Mohnnad H. Alabsi, Peng Zheng, Zhengkai Cao, Jinlin Mei, Yu Shi, Aijun Duan*, Daowei Gao*, Kuo-Wei Huang*, Chunming Xu* 324

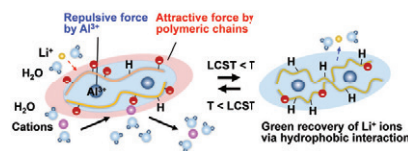
The novel Pt confinement catalyst MoS₂/Pt@TD-6%Ti with dendritic hierarchical pore structures shows excellent sulfur-resistance performance, good stability and high HDS activity in catalytic hydrodesulfurization reactions of DBT and 4,6-DMDBT molecules.



Thermoresponsive Al³⁺-crosslinked poly(*N*-isopropylacrylamide)/alginate composite for green recovery of lithium from Li-spiked seawater

Sung Ho Park, Sang Joon Lee* 334

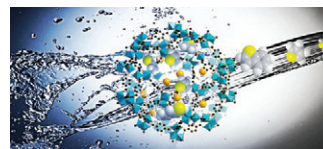
Al³⁺-crosslinked poly (*N*-isopropylacrylamide) (PNIPAAm) /alginate composite selectively adsorbs Li⁺ ions with a low adsorption affinity, while rejecting cations with a high adsorption affinity due to a strong repulsive force by crosslinked Al³⁺. In addition, thermoresponsive PNIPAAm enables green recovery of Li⁺ ions via hydrophobic interaction.



Fabrication of Cu⁺ sites in confined spaces for adsorptive desulfurization by series connection double-solvent strategy

Shu Shi, Yu-Xia Li, Shuai-Shuai Li, Xiao-Qin Liu, Lin-Bing Sun* 345

A series connection double-solvent strategy offers a green and controllable way to fabricate Cu⁺ confined in MOFs. Due to abundant Cu⁺ and high porosity of MOF, the obtained materials exhibit excellent performance in adsorptive desulfurization.



Conversion of Au(III)-polluted waste eggshell into functional CaO/Au nanocatalyst for biodiesel production

Jiadi Liu, Minghuan Liu, Shaoyun Chen, Bingqing Wang, Jin Chen, Da-Peng Yang*, Shangzhou Zhang*, Wenxiao Du* 352

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Waste eggshells were used to adsorb Au(III) in water and convert the Au(III)-polluted eggshells into the functional nanocatalyst-CaO/Au for the transesterification reaction between soybean oil and methanol to the preparation of biodiesel.

