



Front Cover

Engineering crystal plane of NiCo_2O_4 to regulate oxygen vacancies and acid sites for alkali-free oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid

Hengli Qian, keyuan Zhang, Yongchuo He, Qidong Hou, Chao Xie, Ruite Lai, Guanjie Yu, Tianliang Xia, Xinyu Bai, Haijiao Xie, Meiting Ju**

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Review Articles

Engineering of copper sulfide-based nanomaterials for thermoelectric application

Binqi He, Kai Zhang, Maiyong Zhu* 619

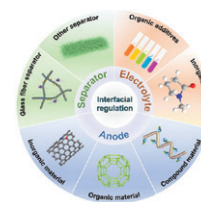
This paper reviews the synthesis methods and thermoelectric performance regulation strategies of copper sulfide nanomaterials, and briefly discusses the existing shortcomings and future prospects of copper sulfide-based thermoelectric materials.



Interfacial regulation for zinc metal anode of aqueous zinc-ion battery

Jing Zhu, Xumeng Ge, Zhi Peng, Liang Pan, Ziyu Peng, Yingqiao Jiang*, Wei Meng, Zekun Zhang, Ningning Zhao, Bin Li, Lei Dai, Ling Wang, Zhangxing He* 689

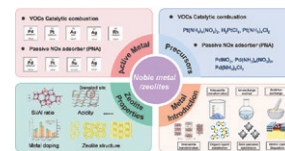
Interfacial regulation serves not solely to prevent the zinc anode from attacking with the electrolyte, but also to enhance the transport kinetics of zinc ion. The mechanism and superiority of the application for the interfacial regulation are comprehensively summarized. The interface regulation was classified according to the battery structure, including anode coating strategy, electrolyte engineering, and separator optimization.



Progress in the construction strategy of noble metal active sites for zeolite-based PNA and VOCs catalysts

Yuan Yao, Haodan Cheng, Guocai Zhong, Xiaolong Tang, Honghong Yi, Shunzheng Zhao, Fengyu Gao, Qingjun Yu* 709

The paper introduces noble metal species and active sites in PNA and VOCs catalysts. Then summarizes the impacts of precursors, zeolite properties, and metal introduction methods on active metal site construction in zeolites for these applications.

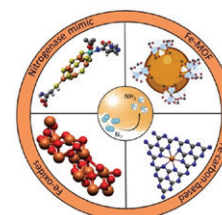


Heterogeneous iron-based catalysts for a sustainable photoinduced nitrogen fixation

Amalia M. Grigoras¹, Federica Valentini¹, Loredana Latterini*, Luigi Vaccaro*.....

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In this review, authors focused our attention on the photocatalytic methods for the synthesis of ammonia; in particular, authors concentrated on stable and recyclable heterogeneous Fe-based photocatalysts for producing NH_3 . Indeed, recoverable and widely abundant and low-cost iron catalysts may represent a very promising tool for future sustainable access to this largely desired chemical target.



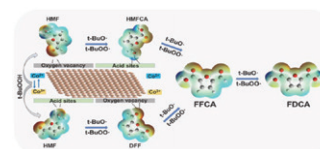
Research papers

Engineering crystal plane of NiCo_2O_4 to regulate oxygen vacancies and acid sites for alkali-free oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid

Hengli Qian, keyuan Zhang, Yongchuo He, Qidong Hou*, Chao Xie, Ruite Lai, Guanjie Yu, Tianliang Xia, Xinyu Bai, Haijiao Xie, Meiting Ju*

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The synergistic mechanism of oxygen vacancies and acid sites for alkali-free oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid.

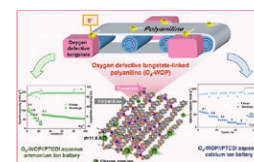


Conjugated polyaniline as “conveyor” in tungstate boosting cation storage for high-performance aqueous batteries

Yanyan Liu, Zirui Shao, Tianming Lv, Zilong Zhang, Zhenhua Zhou, Tao Hu*, Changgong Meng, Yifu Zhang*.....

766

An oxygen defective tungstate-linked polyaniline ($\text{O}_d\text{-WOP}$) is prepared, in which the conjugated polyaniline chains serving as conductive backbones like “conveyors” are crosslinked by oxygen deficient tungstate molecules to form 2D nanosheets. It delivers superior and durable capabilities for NH_4^+ -storage and Ca^{2+} -storage in half cells and full flexible configurations by pairing with PTCDI.

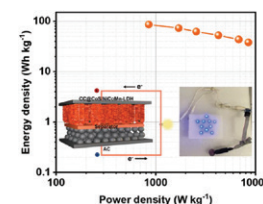


NiCoMn-LDH with core-shell heterostructures based on CoS nanotube arrays containing multiple ion diffusion channels for boosted supercapacitor applications

Xiaojie Xu, Huachen Lin, Jinrui Ding, Pengjie Zhou, Yulong Ying, Hong Jia, Longhua Li*, Yu Liu*.....

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A novel ternary electrode material $\text{CC@CoS/NiCoMn-LDH-300}$ with core-shell heterostructures is developed to enhance the charge storage capacity of asymmetric supercapacitor.

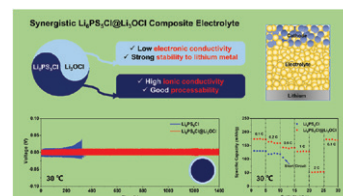


Synergistic $\text{Li}_6\text{PS}_5\text{Cl}@ \text{Li}_3\text{OCl}$ composite electrolyte for high-performance all-solid-state lithium batteries

Yuzhe Zhang, Haolong Chang, Aiguo Han, Shijie Xu, Xinyu Wang, Shunjin Yang, Xiaohu Hu, Yujiang Sun, Xiao Sun, Xing Chen, Yongan Yang*.....

793

Herein, a simple interface-engineering remedy to boost the electrochemical performance of $\text{Li}_6\text{PS}_5\text{Cl}$ is reported, by coating its surface with a Li-compatible electrolyte Li_3OCl having low electronic conductivity. Due to a synergistic effect, the obtained $\text{Li}_6\text{PS}_5\text{Cl}@ \text{Li}_3\text{OCl}$ core@shell structure exhibits great performance improvements compared with the bare $\text{Li}_6\text{PS}_5\text{Cl}$.



Rational engineering of triazine-benzene linked covalent-organic frameworks for efficient CO_2 photoreduction

Yanghe Fu¹, Yijing Gao¹, Huilin Jia, Yuncai Zhao, Yan Feng, Weidong Zhu*, Fumin Zhang, Morris D. Argyle*, Maohong Fan*.....

804

High-efficiency CO_2 photoreduction can be achieved by rationally adjusting the number and position of both benzene and triazine rings in covalent organic frameworks (COFs) with orderly interlaced triazine-benzene heterojunctions that can boost their photocatalytic performance.

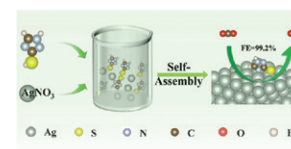


Boosting electrochemical reduction of CO_2 to CO using molecule-regulated Ag nanoparticle in ionic liquids

Fangfang Li, Kuilin Peng, Chongyang Jiang, Shaojuan Zeng, Xiangping Zhang*, Xiaoyan Ji*.....

813

A strategy of introducing functionalized molecules with desirable CO_2 affinity to regulate Ag catalyst for promoting electrochemical reduction of CO_2 was proposed. Specifically, 3-mercaptop-1,2,4-triazole was introduced onto the Ag nanoparticle (Ag-m-Triz) for the first time to achieve selectively converting CO_2 to carbon monoxide (CO).

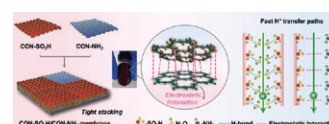


Enhanced interlayer interaction in sulfonated CONs membrane by amino-rich CONs enabling ultrafast proton transport

Ping Li, Bo He, Xuan Li, Yunfei Lin, Shaokun Tang*.....

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Amino-rich CONs (CON-NH_2) bridge sulfonated CONs ($\text{CON-SO}_3\text{H}$) to obtain tightly-stacked self-standing CONs membrane by electrostatic attraction. The shortened $-\text{SO}_3\text{H}$ distance in crystalline nanochannels and the formed acid-base pairs between deprotonated $-\text{SO}_3\text{H}$ and protonated $-\text{NH}_2$ contribute to fast H^+ transfer.

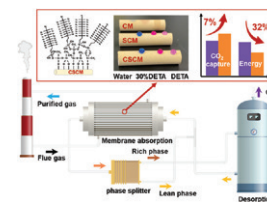


Superhydrophobic ceramic membrane coupled with a biphasic solvent for efficient CO_2 capture

Kaili Xue, Zhen Chen*, Xiaona Wu, Heng Zhang, Haiping Chen*, Junhua Li.....

834

An innovative strategy was proposed by integration of membrane contactor (MC) with biphasic solvent for efficient CO₂ capture from flue gas. This study provides a potential approach for accessing hydrophobic ceramic membranes and biphasic solvents for industrial CO₂ capture.

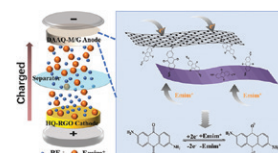


2,6-Diaminoanthraquinone modified MXene (Ti₃C₂T_x)/graphene as the negative electrode materials for ionic liquid-based asymmetric supercapacitors

Li Sun, Lujia Chai, Liangqi Jing, Yujuan Chen, Kelei Zhuo*, Jianji Wang*.....

845

The electrode material with DAAQ modified MXene/graphene composites is synthesized. The DAAQ with redox activity in EmimBF₄ IL electrolyte provides Faradaic contribution and enlarges interlayer spacing of MXene. Meanwhile, MXene/Graphene ensures high electrical conductivity. Therefore, the as-assembled supercapacitor delivers a high energy density and high-power density as well as good cycle stability.



Ti₃C₂ MXene nanosheets integrated cobalt-doped nickel hydroxide heterostructured composite: An efficient electrocatalyst for overall water-splitting

Amaranadha Reddy Manchuri, Kamakshaiah Charyulu Devarayapalli, Bolam Kim, Youngsu Lim, Dae Sung Lee.....

854

A unique Ti₃C₂ MXene nanosheets integrated cobalt-doped nickel hydroxide catalyst is fabricated. The NiCoMX catalyst demonstrates improved performance with an overpotential of 310 mV for OER, 73 mV for HER, and an overall water-splitting voltage of 1.72 V at 10 mA cm⁻², making it highly effective for practical water-splitting applications.

