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A leap by the rise of solid-state electrolytes for Li-air batteries

Kecheng Pan, Minghui Li, Weicheng Wang, Shuochao Xing, Yaying Dou, Shasha Gao, Zhang Zhang*, Zhen Zhou* 939

Commentary

Process reconfiguration and intensification: An emerging opportunity enabling efficient carbon capture and low-cost blue hydrogen production

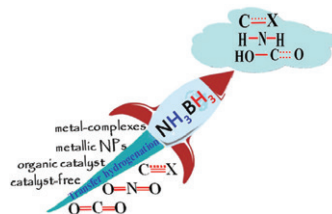
Dongke Zhang* 945

Review articles

Ammonia borane-enabled hydrogen transfer processes: Insights into catalytic strategies and mechanisms

Wenfeng Zhao, Hu Li*, Heng Zhang, Song Yang*, Anders Riisager* 948

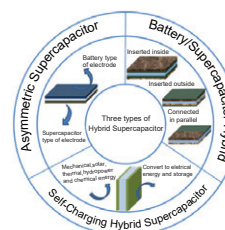
Transfer hydrogenation of unsaturated compounds with ammonia borane as hydrogen donor is an attractive synthesis strategy. This review highlights the recent years of key progress in ammonia borane-initiated hydrogenation reactions, and discuss opportunities and challenges for further promotion of development.



A survey of hybrid energy devices based on supercapacitors

Dan Gao, Zhiling Luo, Changhong Liu*, Shoushan Fan 972

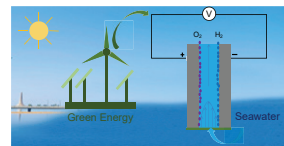
Three types of hybrid devices based on supercapacitors and their ways of hybridization. The hybrid supercapacitors have great application potential for future energy storage system for portable electronics, wearable devices and implantable device.



Strategic comparison of membrane-assisted and membrane-less water electrolyzers and their potential application in direct seawater splitting (DSS)

Abdul Malek, Xu Lu*, Paul R. Shearing, Dan J.L. Brett, Guanjie He* 989

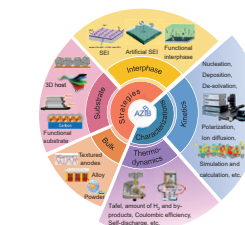
Concentration gradients can potentially be utilised in a membrane-less microfluidic system for direct seawater splitting (DSS) that can avoid the adverse effect posed by seawater impurities.



An in-depth understanding of improvement strategies and corresponding characterizations towards Zn anode in aqueous Zn-ions batteries

Yuzhu Chu, Lingxiao Ren, Zhenglin Hu*, Chengde Huang, Jiayan Luo* 1006

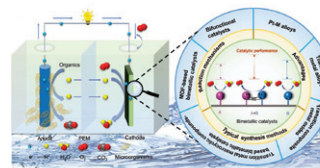
The typical improvement strategies of Zn metal anodes including interphase design, substrate design, and bulk design, as well as the advanced characterization methods utilized to demonstrate the availability of modified strategies are summarized systematically.



Bimetallic catalysts as electrocatalytic cathode materials for the oxygen reduction reaction in microbial fuel cell: A review

Ke Zhao, Yuanxiang Shu, Fengxiang Li*, Guosong Peng 1043

The progress in bimetallic ORR catalysts, including reaction mechanisms, advantages, typical synthesis methods, applications in MFC for energy-efficient wastewater treatment, present challenges and future perspectives, is summarized. Overall, bimetallic ORR catalysts are electrocatalysts with developmental potential.

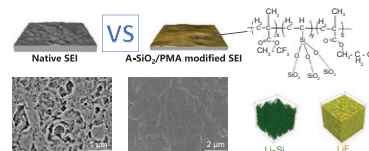


Research papers

Nano silica aerogel-induced formation of an organic/alloy biphasic interfacial layer enables construction of stable high-energy lithium metal batteries

Chengwei Ma, Xinyu Zhang, Chengcai Liu, Yuanxing Zhang, Yuanshen Wang, Ling Liu, Zhikun Zhao, Borong Wu*, Daobin Mu* 1071

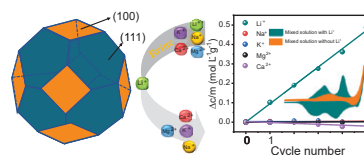
We reported a high conductive hybrid film to induce biphasic interface layer by crosslinking nano silica aerogel, which designed a stable lithium anode. When coupled with NCM811 and S cathodes, the batteries achieve outstanding electrochemical performance.



Construction of truncated-octahedral LiMn2O4 for battery-like electrochemical lithium recovery from brine

Guolang Zhou¹, Linlin Chen¹, Xiaowei Li, Guiling Luo, Zhendong Yu, Jingzhou Yin*, Lei Fan, Yanhong Chao*, Lei Jiang, Wenshuai Zhu* 1081

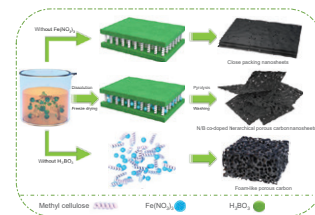
A novel truncated-octahedral LiMn₂O₄ electrode was constructed, which solved the problem that LiMn₂O₄ electrode could not obtain high cycle stability and high adsorption performance simultaneously in the process of lithium extraction from salt-lake.



All-cellulose-based quasi-solid-state supercapacitor with nitrogen and boron dual-doped carbon electrodes exhibiting high energy density and excellent cyclic stability

Kaixuan Li, Ping Li, Zining Sun, Jing Shi, Minghua Huang, Jingwei Chen, Shuai Liu, Zhicheng Shi, Huanlei Wang* 1091

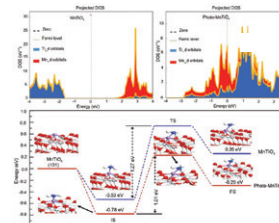
N, B co-doped carbon nanosheets (NBC) are obtained through the dual-template assisted approach by using methyl cellulose as the precursor. Due to the synergistic effects from the high surface area, N/B dual doping, and a high degree of graphitization, the obtained NBC delivers a superior electrochemical performance.



Robust photo-assisted removal of NO at room temperature: Experimental and density functional theory calculation with optical carrier

Yanqin Li¹, Junqi Tian¹, Zhisong Liu¹, Zhongqi Liu, Dong Dong, Fu Wang, Wei Wang, Minmin Liu, Jianming Dan, Yongsheng Li, Feng Yu*, Bin Dai*, Yunbo Yu* 1102

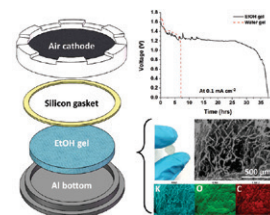
Low temperature catalysts have received intensive attention in the field of selective catalytic reduction (SCR) of NO with NH₃. MnTiO_x catalyst exhibited excellent performance towards the photo-SCR (PSCR) of NO with NH₃ at room temperature. The hybridization of Mn and Ti 3d orbitals was significantly enhanced upon light irradiation, so that MnTiO_x catalyst presented excellent electron-hole separation capability for the dissociative adsorption of NH₃ to form NH₂ fragments and H atoms.



Solid-state Al-air battery with an ethanol gel electrolyte

Yifei Wang*, Wending Pan, Kee Wah Leong, Shijing Luo, Xiaolong Zhao, Dennis Y.C. Leung* 1117

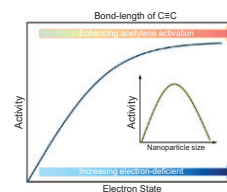
This work develops an innovative ethanol gel electrolyte for the solid-state Al-air battery for the first time, which can effectively inhibit the Al self-corrosion in conventional aqueous and hydrogel Al-air batteries. Consequently, the battery shelf life and discharge efficiency are significantly improved.



Electron-deficient Cu site catalyzed acetylene hydrochlorination

Bolin Wang, Chunxiao Jin, Shujuan Shao, Yuxue Yue, Yuteng Zhang, Saisai Wang, Renqin Chang, Haifeng Zhang*, Jia Zhao*, Xiaonian Li* 1128

This work highlights a recent publication by Jia Zhao and Xiaonian Li et, al. regarding to acetylene hydrochlorination. The electron-deficient Cu active site stabilized by pyrrolic-N is constructed, facilitating the substrates activation, which would contribute to vinyl chloride synthesis.

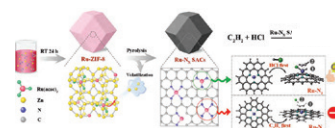


Regulating the coordination environment of Ru single-atom catalysts and unravelling the reaction path of acetylene hydrochlorination

Yang Yang, Chaoyue Zhao, Xianliang Qiao, Qingxin Guan*, Wei Li* 1141

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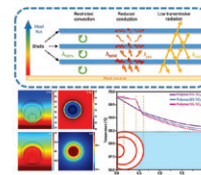
We have controllably constructed Ru-N_x SACs with different N coordination environment, which was conducive to the structure-performance relationship study and exhibited enhanced catalytic performance compared with traditional carbon-supported RuCl₃ catalyst. This work provided a reference for the design and control of metal active sites.



Smart heat isolator with hollow multishelled structures

Kun Wang, Lekai Xu, Jiao Wang, Shaojun Zhang, Yanlei Wang, Nailiang Yang*, Jiang Du*, Dan Wang* 1154

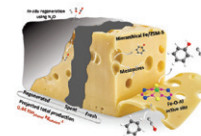
A smart heat isolation material has been fabricated by compositing the hollow multishelled structure with temperature-sensitive polymer. Benefiting from the unique multishelled structure, thermal energy is found to be gradually guided into the hollow structure and stored inside.



Oxidation of benzene to phenol with N₂O over a hierarchical Fe/ZSM-5 catalyst

Cui Ouyang, Jianwei Li*, Yaqi Qu, Song Hong, Songbo He* 1161

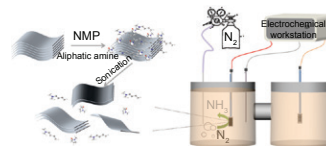
The hierarchical Fe/ZSM-5 zeolite catalyst provides high accessibility of Fe-O-Al active sites for the oxidation of benzene to phenol with N₂O, showing superior catalyst activity, stability, and regenerability. The total phenol productivity is estimated at 0.44 ton_{phenol} kg_{catalyst}⁻¹.



Intercalation assisted liquid phase production of disulfide zirconium nanosheets for efficient electrocatalytic dinitrogen reduction to ammonia

Yangshuo Li, Huiyong Wang*, Bing Chang, Yingying Guo, Zhiyong Li, Shamraiz Hussain Talib, Zhansheng Lu, Jianji Wang* 1174

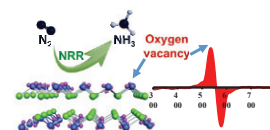
The aliphatic amine intercalation assisted efficient liquid-phase exfoliation strategy is proposed to produce ZrS₂ nanosheets from bulk ZrS₂ powder with the exfoliation yield high up to 27.3% and they have shown high catalytic performance for the electrocatalytic N₂ reaction to NH₃.



Vacancy engineering of oxidized Nb₂CTx MXenes for a biased nitrogen fixation

Mengzhao Zhang¹, Hanqing Yin¹, Fuhao Jin, Jingquan Liu, Xuqiang Ji, Aijun Du*, Wenrong Yang, Zhen Liu* 1185

Oxygen vacancy induced high-efficiency nitrogen fixation on a Nb₂CTx MXene catalyst.

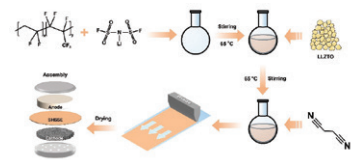


Tuning composite solid-state electrolyte interface to improve the electrochemical performance of lithium-oxygen battery

Hao Ouyang, Shan Min, Jin Yi*, Xiaoyu Liu, Fanghua Ning, Jiaqian Qin, Yong Jiang, Bing Zhao*, Jiujun Zhang 1195

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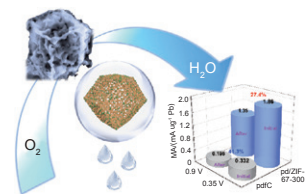
In order to eliminate the boundary between ceramic particles, increase the amorphous region of polymer and ensure fast ionic transport, succinonitrile is introduced for composite solid-state electrolyte, which enable to achieve a long cycle life of 3000 h of the symmetric battery. Furthermore, the enhanced electrochemical performance of solid-state Li-O₂ batteries based on the composite solid-state electrolyte have been obtained.



Pd nanoparticles embedded in N-Enriched MOF-Derived architectures for efficient oxygen reduction reaction in alkaline media

Daqiang Yan, Lin Zhang, Lei Shen, Runyu Hu, Weiping Xiao*, Xiaofei Yang* 1205

The zeolitic imidazolate frameworks (ZIF-67) was employed as self-sacrificial precursors to prepare N-doped Co₃O₄ carbon-based materials, which could anchor the Pd nanoparticles. The obtained Pd/ZIF-67 exhibited excellent ORR catalytic performance, high Pd mass activity, and long-term durability.



Breaking the temperature limit of hydrothermal carbonization of lignocellulosic biomass by decoupling temperature and pressure

Shijie Yu, Xiaoxiao Yang, Qinghai Li, Yanguo Zhang, Hui Zhou* 1216

A decoupled temperature and pressure hydrothermal (DTPH) reaction system was developed to break the temperature limit of the hydrothermal carbonization of lignocellulosic biomass, realizing a low-temperature carbonization at 200 °C.

