



Front Cover

Aqueous-phase reforming of hydroxyacetone solution to bio-based H₂ over supported Pt catalysts

A.K.K. Vikla, K. Koichumanova, Songbo He*, K. Seshan

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Short communication

Alcohol solvent effect on the self-assembly behaviors of lignin oligomers

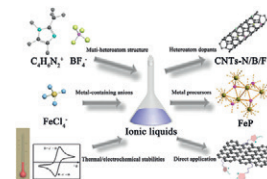
Ya Ma, Zhicheng Jiang*, Yafei Luo, Xingjie Guo, Xudong Liu, Yiping Luo, Bi Shi 597

Review articles

Ionic liquid derived electrocatalysts for electrochemical water splitting

Tianhao Li*, Weihua Hu* 604

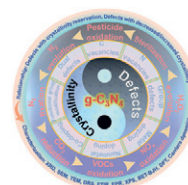
Ionic liquid (IL) and poly (ionic liquid) (PIL) have been widely involved in electrocatalyst preparation for water splitting. In this review, studies of ILs/PILs-derived electrocatalysts for HER and OER were evaluated, where ILs/PILs were applied as precursors to prepare catalysts or directly utilized as catalysts. All these accomplishments and developments are systematically summarized and thoughtfully discussed. Then, the overall perspectives for the current challenges and future development are provided.



Crystallinity-defect matching relationship of g-C₃N₄: Experimental and theoretical perspectives

Yuhan Li, Ziteng Ren, Zhengjiang He, Ping Ouyang, Youyu Duan*, Wendong Zhang*, Kangle Lv, Fan Dong* 623

This review summarizes the design of highly efficient g-C₃N₄ photocatalyst with excellent environmental purification performance and energy conversion efficiency from the aspects of balancing the relationship between defect concentrations and crystallinity reservation.



Recent advances and future prospects on Ni₃S₂-Based electrocatalysts for efficient alkaline water electrolysis

Shiwen Wang, Zhen Geng*, Songhu Bi, Yuwei Wang, Zijian Gao, Liming Jin, Cunman Zhang* 659

The review comprehensively summarizes the recent progress of Ni₃S₂-based electrocatalysts for alkaline water electrocatalysis. The HER and OER mechanisms, performance evaluation criteria, preparation methods, and strategies for performance improvement of Ni₃S₂-based electrocatalysts are deeply discussed. And challenges and perspectives are also analyzed.

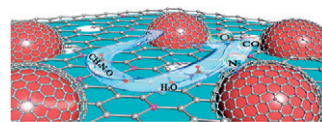


Research papers

Pyridinic-N doping carbon layers coupled with tensile strain of FeNi alloy for activating water and urea oxidation

Guangfu Qian, Wei Chen, Jinli Chen, Li Yong Gan*, Tianqi Yu, Miaoqing Pan, Xiaoyan Zhuo, Shibin Yin* 684

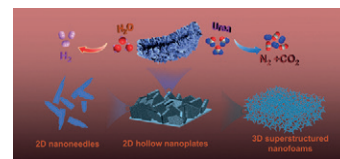
Pyridinic-N carbon coupled with tensile strain of FeNi to boost OER/UOR activity at large current density.



Engineering hierarchical quaternary superstructure of an integrated MOF-derived electrode for boosting urea electrooxidation assisted water electrolysis

Jianjun Tian, Changsheng Cao*, Yingchun He, Muhammad Imran Khan, Xin-Tao Wu, Qi-Long Zhu* 695

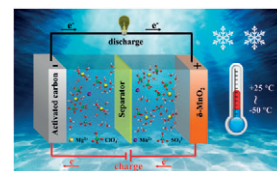
An integrated MOF-derived electrode featuring a peculiar hierarchical quaternary superstructure is fabricated through a self-sacrificing template strategy, which possesses improved mass/charge transport and active site accessibility, and thus affords excellent UOR performance for promoting hydrogen evolution with lower energy input.



An aqueous magnesium-ion hybrid supercapacitor operated at -50 °C

Guoshen Yang¹, Gangrui Qu¹, Chi Fang¹, Jie Deng, Xianqi Xu, Yinghao Xie, Tian Sun, Yachao Zhu, Jiaxin Zheng*, Hang Zhou * 702

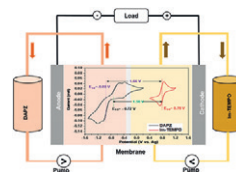
This work pioneers a convenient, cheap, and eco-friendly tactic to procure low-temperature aqueous magnesium-ion energy storage device.



Pairing nitroxyl radical and phenazine with electron-withdrawing/-donating substituents in “water-in-ionic liquid” for high-voltage aqueous redox flow batteries

Zhifeng Huang*, Rolf Hempelmann, Yiqiong Zhang, Li Tao*, Ruiyong Chen * 713

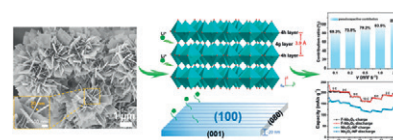
The organic redox-active materials of TEMPO and phenazine with functional groups, providing a large redox potential gap in “water-in-ionic liquid” electrolytes, have been demonstrated towards a high-voltage aqueous redox flow battery.



F-doped orthorhombic Nb₂O₅ exposed with 97% (100) facet for fast reversible Li⁺-Intercalation

Xiaodi Liu, Yufeng Tang, Dan Zhang, Guangyin Liu*, Xinwei Luo, Yi Zeng, Xiu Li*, Jianmin Ma... 723

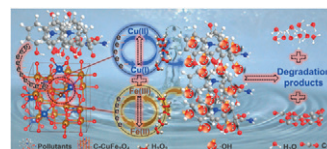
F-doped T-Nb₂O₅ microflowers (F-Nb₂O₅) are synthesized through topotactic conversion. F-Nb₂O₅ are assembled from nanoflakes with exposed (100) facet, which maximizes the exposure of feasible Li⁺ transport pathways along loosely packed 4g atomic layers to electrolytes, enhancing the Li⁺-intercalation performance



Carbon-doped CuFe₂O₄ with C--O--M channels for enhanced Fenton-like degradation of tetracycline hydrochloride: From construction to mechanism

Hong Qin, Yangzhuo He, Piao Xu*, Yuan Zhu*, Han Wang, Ziwei Wang, Yin Zhao, Haijiao Xie, Quyang Tian, Changlin Wang, Ying Zeng, Yicheng Li..... 732

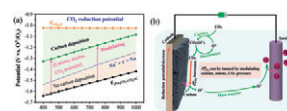
The carbon doped CuFe₂O₄ (C-CuFe₂O₄) with improved surface morphology and amplified electron transport channel was synthesized by a simple two-step hydrothermal method, which exhibits efficient catalytic performance in Fenton-like reaction to degrade tetracycline hydrochloride.



A general descriptor for guiding the electrolysis of CO₂ in molten carbonate

Zhengshan Yang, Bowen Deng, Kaifa Du, Huayi Yin*, Dihua Wang*..... 748

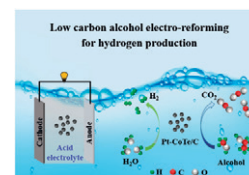
A proof-of-the-concept of the CO₂ activity descriptor was verified to reveal the electrolyte–electrode-reaction relationship under the anions and cations effect on the CO₂RR in molten carbonate.



Low carbon alcohol fuel electrolysis of hydrogen generation catalyzed by a novel and effective Pt–CoTe/C bifunctional catalyst system

Yang Zhou, Lice Yu, Jinfa Chang, Ligang Feng*, Jiujun Zhang 758

The current study offers a novel platform for hydrogen generation via low carbon alcohol fuel electrolysis, and the result is helpful to the catalysis mechanism understanding of Pt assisted by the novel promoter.

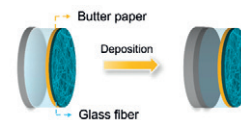


Bilayer separator enabling dendrite-free zinc anode with ultralong lifespan >5000 h

Lu Wang¹, Feifei Wang¹, Zhe Ding, Yingxin Liu, Ziyi Zhang, Chunpeng Yang*, Quan-Hong Yang*... 771

Green Energy & Environment

A bilayer separator, comprised of butter paper and glass fiber membrane, was proposed to stabilize Zn anodes by providing a zincophobic and highly robust interface between the Zn anodes and separator.



Aqueous-phase reforming of hydroxyacetone solution to bio-based H₂ over supported Pt catalysts

A.K.K. Vikla, K. Koichumanova, Songbo He*, K. Seshan 777

Pt-based catalysts supported on three supports (C, AlO(OH), and ZrO₂) were investigated for the APR of hydroxyacetone solution. Among them, the Pt/C catalyst showed the highest turnover frequency for H₂ production and the longest catalyst stability.

