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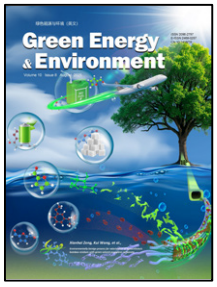


Front Cover

Environmentally benign process for valorization of lignocellulosic bamboo residues with green solvent propylene carbonate

Jie Liang, Jingcong Xie, Jianchun Jiang, Yan Ma, Jun Ye, Xianhai Zeng, Kui Wang**

CONTENTS

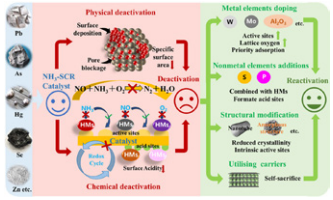
Review articles

Advanced microwave synthesis strategies for innovative photocatalyst design
Shunda Li[1], Hao Ma[1], Ping Ouyang, Yuhan Li*, Youyu Duan*, Yunqiao Zhou, Wee-Jun Ong, Fan Dong…… 1597

This review systematically and comprehensively summarizes microwave-assisted preparation methods for photocatalysts, highlighting the advantages of various microwave synthesis techniques, and conducts a systematic review of microwave-based modification strategies for photocatalysts.

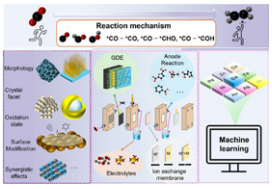
Heavy metal challenge in NH_3-SCR $DeNO_x$ catalysts: Poisoning deactivation mechanisms and enhanced resistance strategies
Yu Xia, Fengyu Gao*, Jiajun Wen, Tingkai Xiong, Honghong Yi, Qingjun Yu, Shunzheng Zhao, Yuansong Zhou, Xiaolong Tang *…… 1624

This article reviews NH_3-SCR technology for flue gas denitrification, detailing how heavy metals deactivate catalysts through pore blockage, surface loss, and active site damage. It compares catalyst behaviors, analyzes multi-pollutant effects, and highlights strategies—doping, structural optimization, regeneration to enhance resistance.



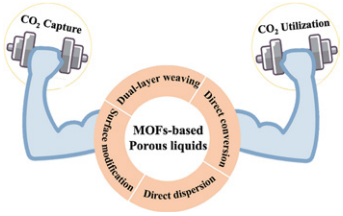
Advances in Cu-based catalysts for electroreduction of CO_2 to C_2H_4 in flow cells
Yunxia Zhao[1], Yun Shi[1], Yunfei Bu*…… 1648

The synopsis of this review. It mainly includes the mechanism of electrocatalytic reduction of CO_2 to C_2H_4, the design strategies of catalyst, the selection and optimization of flow cell components, and applications of machine learning.



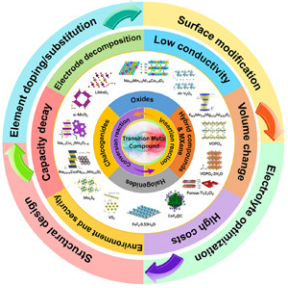
MOFs-based porous liquids for CO_2 capture and utilization
Xun Wang, Yuxi Liu, Hongxing Dai, Zhen Wei, Shaohua Xie, Jiguang Deng*..... 1674

As a new liquid material, metal-organic frameworks (MOFs)-based porous liquids (PLs) have great potential in removing CO_2. This review summarized the latest fabrication strategy of MOFs-based PLs and their performance for CO_2 absorption and utilization, are proposed challenges and opportunities for MOFs-based PLs in the future development.



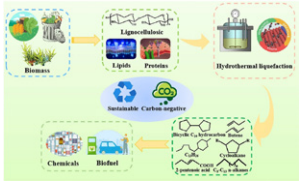
Progress and prospect of transition metal compound cathode materials with stable metal ion storage effect in various battery systems
Dongfang Guo*, Bin Zhang*..... 1692

As a key cathode material for secondary batteries, transition metal compounds, mainly layered transition metal oxides, play an important role in the development of various battery energy storage systems. By summarizing the research progress of such transition metal compounds in various rechargeable metal ion batteries, it is helpful to provide effective guidance for the design of high-performance rechargeable battery substitutes to alleviate the application pressure of single batteries in some scenarios.



Hydrothermal liquefaction for preparation of liquid fuels and chemicals: Solvent effects, catalysts regulation and thermochemical conversion processes
Bingbing Qiu*, Xuedong Tao, Yanfang Wang, Donghui Zhang, Huaqiang Chu* 1727

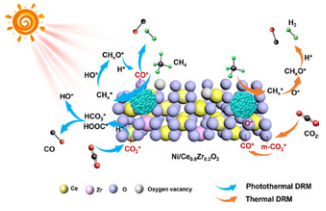
This review discusses the latest advancements in the mechanisms of solvent and catalyst systems in the hydrothermal liquefaction of various biomass types for the production of liquid fuels and high-value chemicals, which can facilitate carbon neutrality.



Research papers

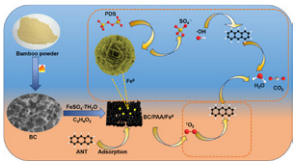
Photothermal dry reforming of methane reaction over $(Ni/Ce_{0.8}Zr_{0.2}O_2)@SiO_2$ catalysts: The Ni content regulation
Xiaoyan Tian, Yu Shi, Jianming Zhang*, Fagen Wang* 1751

Photothermal DRM performance was dependent on Ni content in the $(Ni/Ce_{0.8}Zr_{0.2}O_2)@SiO_2$ catalysts. The optimized $(6Ni/Ce_{0.8}Zr_{0.2}O_2)@SiO_2$ reached the highest DRM rate compared to other investigated catalysts, resolving Ni sintering and carbon deposition by the synergetic contributions from metal-support interaction and confinement effect.



Activation of persulfate using a biochar polyacrylic acid composite loaded with nanoscale zero-valent iron for the *in situ* remediation of anthracene-contaminated soil
Fengjun Li, Dongyun Chen*, Shihong Dong, Najun Li, Qingfeng Xu, Hua Li, Jianmei Lu*…… 1764

In this research, a new type of nanoscale zero-valent iron-loaded biochar polyacrylic acid composite material catalysts were fabricated. Green degradation of anthracene pollutants in soil through both free radical and non-free radical pathways.

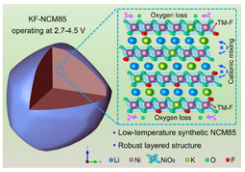


Environmentally benign process for valorization of lignocellulosic bamboo residues with green solvent propylene carbonate
Jie Liang, Jingcong Xie, Jianchun Jiang, Yan Ma, Jun Ye, Xianhai Zeng*, Kui Wang*…… 1777

An environmentally benign PC/p-TsOH biphasic system was designed to efficiently separate lignocellulosic fractions at 130 °C for 1 h, which provides a promising green strategy for the efficient valorization of lignocellulosic biomass in industrial biorefineries.

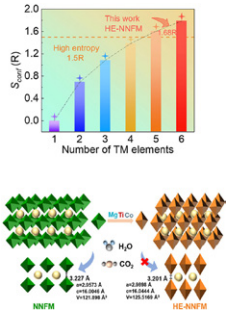
Limiting cationic mixing and lattice oxygen loss of single-crystalline Ni-rich Co-poor cathodes for high-voltage Li-ion batteries
Hujun Zhang, Haifeng Yu, Ling Chen, Muslum Demir, Qilin Cheng*, Hao Jiang*…… 1789

The anion-cation synergistic strategy lowers the lithiation temperature of single-crystalline NCM85 and strong TM-F bonds are formed. Therefore, a highly ordered and robust layered structure is obtained operating at high voltage.



Multicomponent high-entropy assisted high-rate and air-stable layered cathode for sodium ion batteries
Renyi Ma, Jiaqi Wang, Guohua Zhu, Yongguang Liu, Ling Wang, Xiaoyan Zhang*, Linzhe Wang, Lei Dai, Shan Liu*…… 1797

O3-type $NaNi_{0.25}Fe_{0.21}Mn_{0.18}Co_{0.21}Ti_{0.1}Mg_{0.05}O_2$ has been successfully synthesized by introducing a high-entropy strategy based on O3-type $NaNi_{1/3}Fe_{1/3}Mn_{1/3}O_2$.The introduction of Co, Ti, and Mg ions increases the disorder in the system, and the delayed phase transition effect in the high-entropy material mitigates the disruption of the O3 structure by the insertion and extraction of sodium ions, allowing the HE-NNFM material to exhibit excellent reversibility and air stability.



Constructing multiple sites porous organic polymers for highly efficient and reversible adsorption of triiodide ion from water
Zhiyong Li*, Yibo Fu, Yilong Li, Ruipeng Li, Yuanchao Pei*, Yunlei Shi, Huiyong Wang*…… 1807

The porous organic polymer adsorbent demonstrated outstanding performance in I3-adsorption, achieving an exceptional adsorption capacity, the highest average adsorption rate, and notable low-concentration adsorption efficiency.