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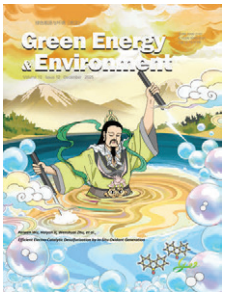


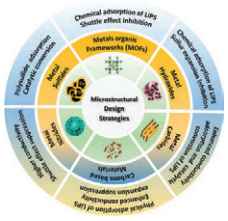
Front Cover

Efficient electro-catalytic desulfurization by in-situ oxidant generation

Yang Cao, Shilong Zhou, Linlin Chen, Yan Huang, Hui Liu, Yiru Zou, Peiwen Wu, Haiyan Ji*, Wenshuai Zhu*, Chunming Xu*

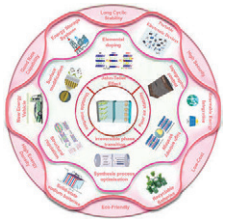
CONTENTS

Innovative microstructural modification strategies of Li-S battery cathodes are carefully summarized. Strategies integrating carbon frameworks and metal compounds are emphasized, revealing breakthroughs that strengthen Li-S battery performance and positioning them as promising next-generation solutions.



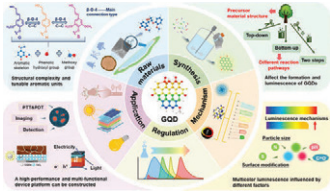
Insights into degradation mechanisms and engineering strategies of layered manganese-based oxide cathodes for sodium-ion battery

This review summarizes the present status of researches on manganese-based oxides for sodium-ion batteries, analyzes the problems of their applications, and provides solutions, which can provide guidance for subsequent researches.



Lignin-derived high-quality graphene quantum dots: Synthesis, mechanistic insights, and emerging applications

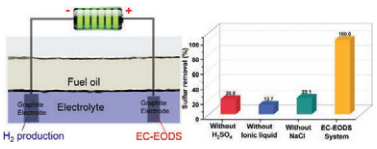
This figure illustrates the transformation of renewable lignin structural motifs into lignin-derived graphene quantum dots (L-GQDs), emphasizing tailored green synthesis strategies, tunable photoluminescence behaviors, and their versatile applications in biomedical, optoelectronic, and environmental fields.



Research papers

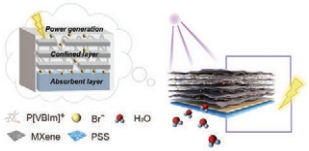
Efficient electro-catalytic desulfurization by in-situ oxidant generation

A novel extraction-coupled electrocatalytic oxidative desulfurization (EC-EODS) system achieves rapid, energy-efficient sulfur removal from fuel oils under mild conditions, with integrated product separation and electrolyte regeneration, offering a sustainable approach for cleaner fuel production.



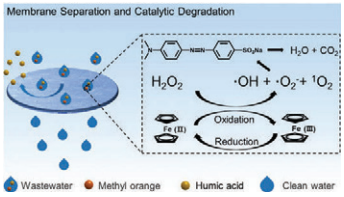
High-performance moisture-driven power generators based on in-situ confined polymerized ionic liquid membranes

This study presents the preparation of high-performance moisture-driven power generators, which incorporate ion-transport nanochannels, ion sources, and water absorbent layer, offering a promising way for harnessing low-grade thermal energy from moisture.



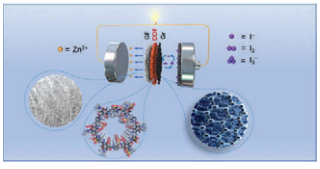
Ferrocene-functionalized ultrafiltration membrane: Integrated approach for natural organic matter separation and catalytic degradation of small-molecule dye

This study developed a ferrocene-based catalytic membrane via UV photopolymerization. By integrating Fenton reactions with membrane filtration, it efficiently degrades pollutants, prevents iron sludge, and offers self-cleaning and high reusability for advanced wastewater treatment.



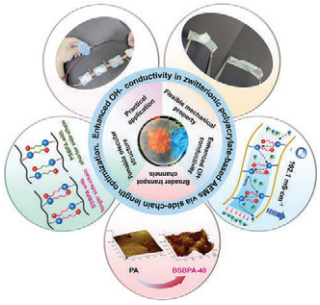
Sulfonated covalent organic framework modified separator enables long-span and high-capacity zinc-iodine batteries

A sulfonated covalent organic framework based composite separator enables homogeneous Zn^{2+} flux and simultaneous suppression of polyiodides shuttling, leading to a long-span and high-capacity aqueous zinc-iodine battery.



Enhanced hydroxide conductivity in zwitterionic polyacrylate-based anion exchange membranes via side-chain length optimization

This study reports a series of zwitterionic polyacrylates with meticulously designed molecular architectures, wherein the spacer length of the zwitterion is optimized. The BSBPA-40 membrane, featuring a longer spacer length, demonstrates more distinct microphase separation and exceptional OH^- conductivity, reaching 102.1 mS cm^{-1} at 80 °C and 90% RH. Specifically, the BSBPA-40 membrane-based zinc-air battery achieves an exceptional power density of 156.7 mW cm^{-2} at room temperature, while its water electrolysis performance reaches 2.1 A cm^{-2} at 2.0 V.



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Efficient construction of SiC membranes to filtrate high-temperature dust-laden gas for environmental sustainability

An innovative support hydrophobization method was proposed to effectively solve particle penetration, enabling fabrication of defect-free asymmetric SiC membranes. The membranes achieve high gas permeance and 99.99% rejection towards $PM_{0.3}$ nanoparticles for high-temperature dust-laden gas filtration.