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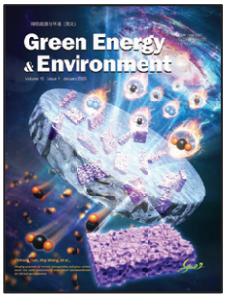

Front Cover

Merging polymers of intrinsic microporosity and porous carbon-based zinc oxide composites in novel mixed matrix membranes for efficient gas separation

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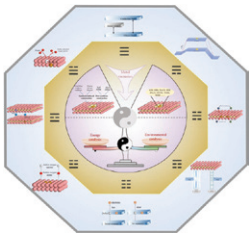
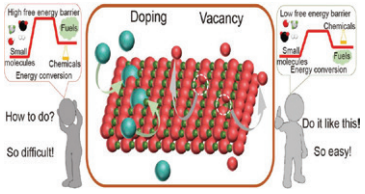
CONTENTS

Using the concepts of Yin and Yang from Tai Chi to symbolize energy and environment, and based on the shapes and meanings of the Bagua, eight roles of metal vacancies are illustrated. For example, "☰" and "☲" embody possessing energy (generating defect energy levels) and imparting impetus (activating lattice oxygen).

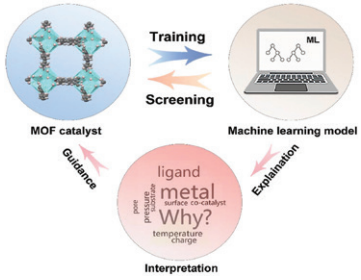


This review systematically summarized the recent advances of different point defects in regulating the electronic structure, generating optimized reaction pathways, enhanced electrocatalytic selectivity and efficiency for the electrochemical energy conversion processes.

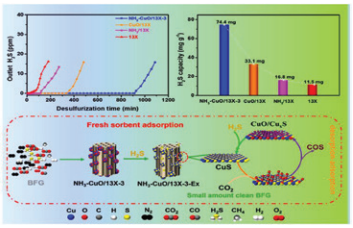


Research papers

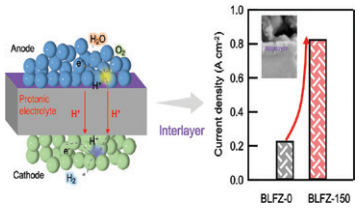
High-throughput screening of MOFs catalysts for CO_2 cycloaddition has been accomplished in a relatively short period of time with a machine learning model. The combined high efficiency and accuracy of the model was attributed to the judicious choice of easily accessible descriptors based on the reaction mechanism. The experimental catalytic performance of MOF-76(Y) agrees well with the prediction results, as a top performing catalyst.



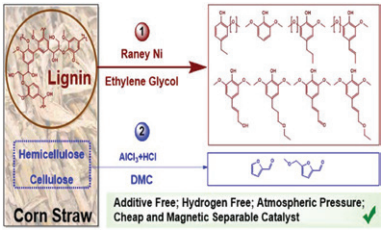
This study introduces an improved zeolite-based adsorbent, NH_3–CuO/13X, for low-temperature H_2S removal from blast furnace gas, offering enhanced desulfurization performance and sulfur capacity, vital for meeting strict emission standards.



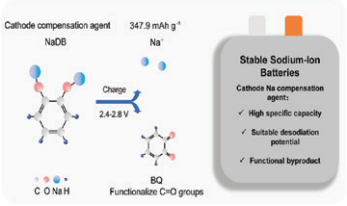
An efficient functional interlayer $Ba_{0.95}La_{0.05}Fe_{0.8}Zn_{0.2}O_{3-\delta}$ was fabricated between the anode and the electrolyte for Zr-rich side protonic solid oxide electrolysis cell, which improves the interfacial contact and greatly enhances the anode reaction kinetics, thus boosting high performances.



This research develops an eco-friendly, cost-effective process converting corn straw into chemicals like lignin monomers, furfural, and 5-methoxymethylfurfural using a magnetic Raney Ni catalyst and ethylene glycol, achieving significant yields in a streamlined, scalable system.



A 1,2-dihydroxybenzene Na salt was proposed as a cathode compensation agent with high specific capacity, lower desodiation potential and high utilization (99%). Its byproduct could functionalize HC with more Cdouble bondO groups and promotes its reversible capacity.



The differentiatingly surface-regulated ceramic-based composite electrolyte (DSCCE) is constructed and applied in Li–air batteries. Because of the antioxidative PMMA-based layer with LiI redox mediator catalyst, anode-friendly PVDF-HFP-based coating and compact/stable ceramic frameworks, the corresponding cells shows the excellent cycling life under ambient air.