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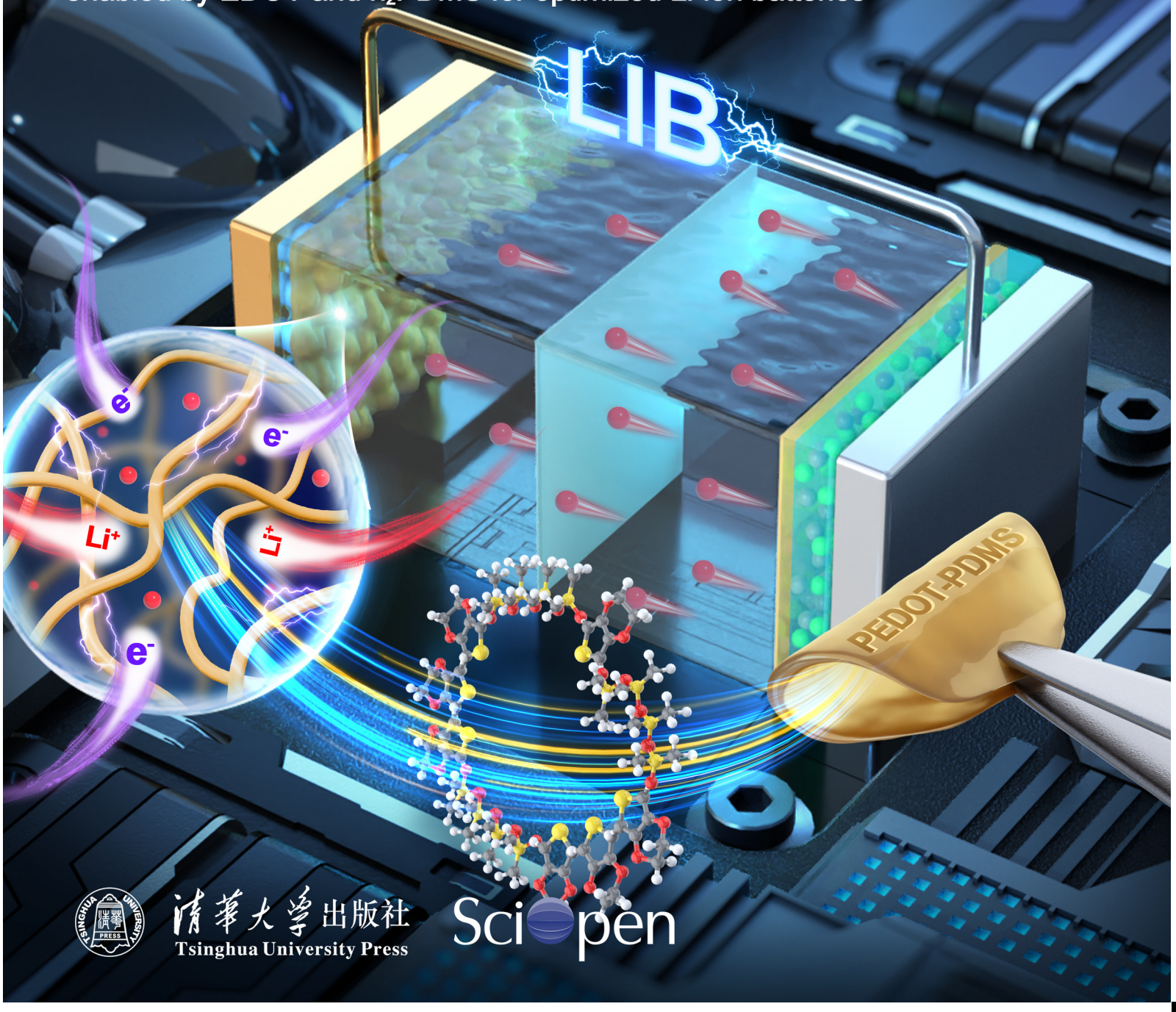
Electron/ion-conductive and flexible dual-functional copolymer enabled by EDOT and h_2PDMS for optimized Li-ion batteries



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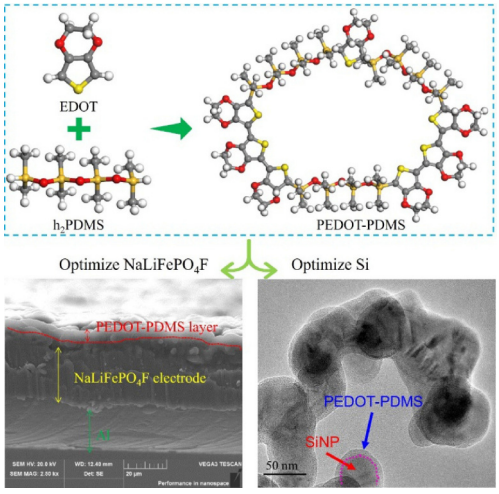
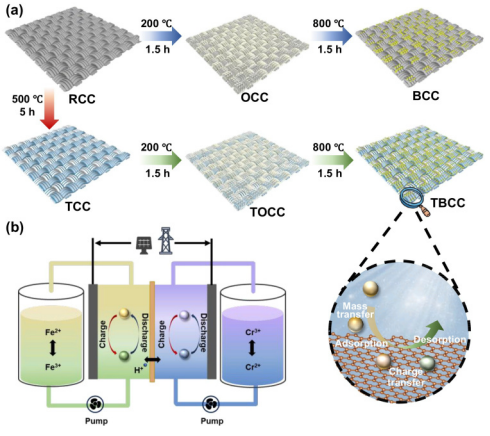


Electron/ion-conductive and flexible copolymer PEDOT-PDMS is synthesized from h_2PDMS and EDOT, which not only can effectively optimize high-voltage $NaLiFePO_4F$ cathode, but also stabilize high-capacity Si anode. It could be also a potential material for optimizing other electrode materials.



We proposed a method of preparing nano bismuth catalyst modified carbon cloth electrode (TBCC) based on intrinsic defect assisted catalyst attachment. By utilizing the carbon thermal reaction to firmly adhere the bismuth catalyst to the electrode surface, the electrochemical performance and reaction kinetics of the TBCC electrode are significantly improved.

All-cellulose triboelectric textile with complete biodegradability for eco-friendly smart wearable electronics

Qiru Lian, Jiaxin Li, Ting Li, Qiuyu Li, Yifang Liang, Hanguang Wu*, and Rui Wang

Beijing Key Laboratory of Clothing Materials R & D and Assessment, Beijing Institute of Fashion Technology, Beijing 100029, China

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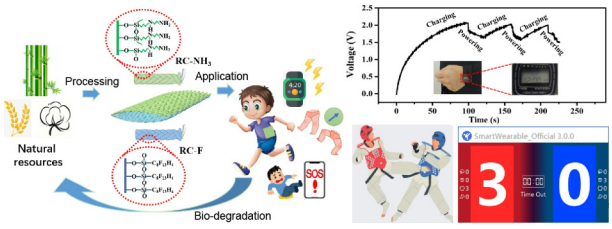

We fabricated a regenerated cellulose-based TENG-T (RC TENG-T) with complete biodegradability through braiding and knitting technology, in which two friction layers were chemically modified by using two silane hydrolysates with opposite electro-affinity. The RC TENG-T can be completely bio-degraded under the function of cellulase after 72 h, endowing it with wide application potential as eco-friendly smart wearable devices including microelectronics power source and self-powered sensor with capability of monitoring human physical conditions and the external pressure.

Back Cover

RuO_x clusters anchored on self-assembled SnO_2 cubic nanocage for boosting sustainable acidic water oxidation

Jingjing Zhang[1,4], Fatimah Kehinde Busari[1,4], Yifei Zhang[2], Song Guo[1,*], Yang Zhao[1], Binli Wang[3,*], Qiong Zeng[1], Zhen Zhao[2,*], and Gao Li[1,2,4,*]

[1] State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China
[2] Institute of Catalysis for Energy and Environment, College of Chemistry and Chemical Engineering, Shenyang Normal University, Shenyang 110034, China
[3] Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen 518055, China
[4] University of Chinese Academy of Sciences, Beijing 100039, China

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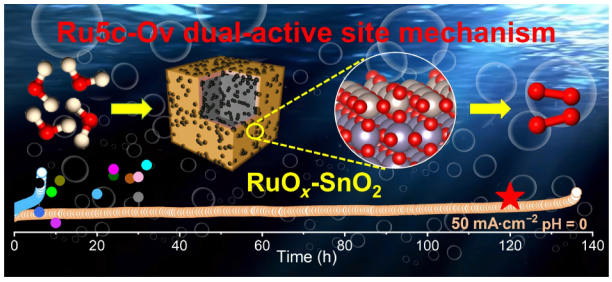

RuO_x nanoclusters are precisely anchored onto a SnO_2 cubic nanocage, significantly enhancing the acid OER catalytic activity and stability of Ru-based catalysts. This advantage stems from the high density of exposed active sites of RuO_x clusters and the abundant oxygen vacancies of SnO_2 nanocages.

3D ordered RuO_2/WO_3 heterostructure inverse opal arrays for highly-active and stable acidic oxygen evolution reaction

Runlong Jia, Yan Tan, Aoshuang Li, Yijie Wang, and Chuanwei Cheng*

Shanghai Key Laboratory of Special Artificial Microstructure Materials and Technology, School of Physics Science and Engineering, Tongji University, Shanghai 200092, China

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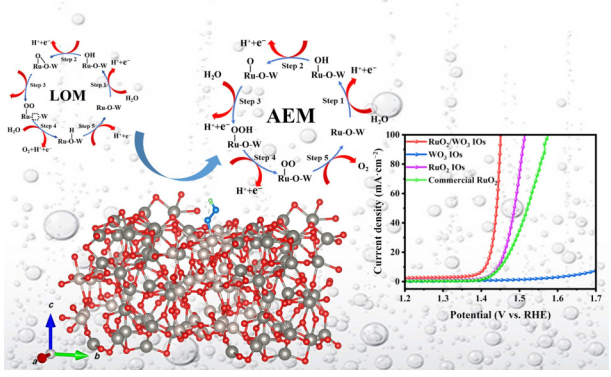

We report a highly ordered RuO_2/WO_3 inverse opals (IOs) catalyst to achieve both excellent activity and stability, in which the crystalline and corrosion-resistant WO_3 facilitates electron transport and stabilizes RuO_2, whereas the lattice mismatch-induced amorphous-dominated RuO_2 provides abundant unsaturated coordination sites to enhance the acidic oxygen evolution reaction (OER) activity. Experimental characterizations and density functional theory calculations reveal that interface coupling between WO_3 and RuO_2 can facilitate OER pathway to switch from lattice oxygen mechanism to adsorbate evolution mechanism, which significantly decreases the reaction energy barrier of OER process.

Crystallinity degree of $MoSe_2$ influencing its potassium-ion storage performance

Jiamei Liu[1,2], Xiaowei Shi[3], Jia Liu[2], Chang Huang[2], Chao Li[4], Haixiao Kang[5,*], Zhan Gao[1,*], and Lei Li[3,*]

[1] School of Chemical Engineering and Technology, Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an 710049, China
[2] Instrument Analysis Center of Xi'an Jiaotong University, Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an 710049, China
[3] State Key Laboratory for Mechanical Behavior of Materials, School of Materials Science and Engineering, Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an 710049, China
[4] School of Chemistry, Xi'an Jiaotong University, No.28, Xianning West Road, Xi'an 710049, China
[5] College of Geography and Environment, Baoji University of Arts and Sciences, Baoji 721013, China

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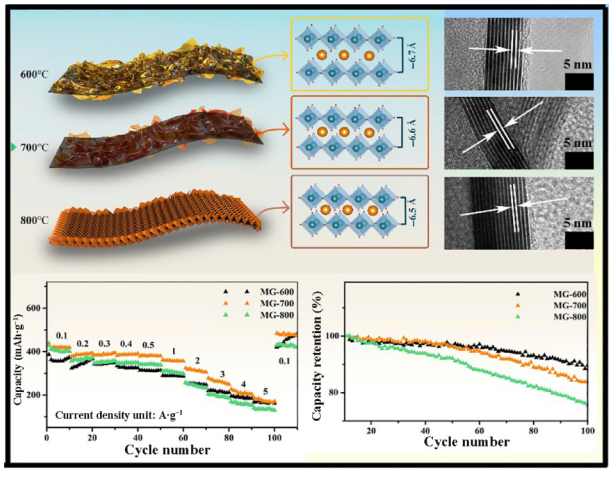

By modulating the thermal annealing temperature, $MoSe_2$-GNR materials with varying crystallinities were obtained. Increased thermal annealing temperature resulted in a reduction of the interlayer spacing of the (002) plane in $MoSe_2$, coupled with an enhancement in crystallinity. The materials characterized by higher crystallinity exhibited improved capacitance performance; however, a decline in cycling stability was noted.

Subtle tuning of micro-environment in COFs nanoribbons actuates low electricity-consumption photo-assisted Co-electrolysis of methanol and CO_2

Yi-Rong Wang[1], Hui-Min Ding[1], Ming Yue[1], Qi Li[1], Jing-wen Shi[1], Qing Huang[2], Jie Zhou[3], Ying Zang[1,*], Yifa Chen[1,*], Shun-Li Li[1], and Ya-Qian Lan[1,*]

[1] Guangdong Provincial Key Laboratory of Carbon Dioxide Resource Utilization, School of Chemistry, South China Normal University, Guangzhou 510006, China
[2] College of Materials Science and Engineering, Nanjing Forestry University, Nanjing 210037, China
[3] Key Laboratory of Electrochemical Energy Storage and Energy Conversion of Hainan Province, School of Chemistry and Chemical Engineering, Hainan Normal University, Haikou 571158, China

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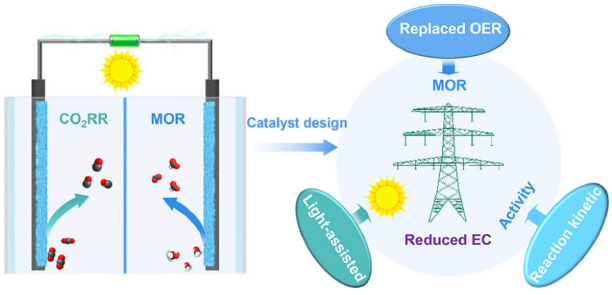

The inherent nature of the retrenchment of electricity consumption has been studied by exploring the photo-assisted co-electrolysis of methanol and CO_2 system using a kind of hydroxyl-rich covalent organic frameworks (Dha-COF-Co) with well-tuned pore structure and morphology.

Review Articles

Photoelectrocatalytic hydrogen production: Hydrogen production principle, performance optimization strategy, application and prospect

Fen Qiao*

School of Energy & Power Engineering, Jiangsu University, Zhenjiang 212013, China

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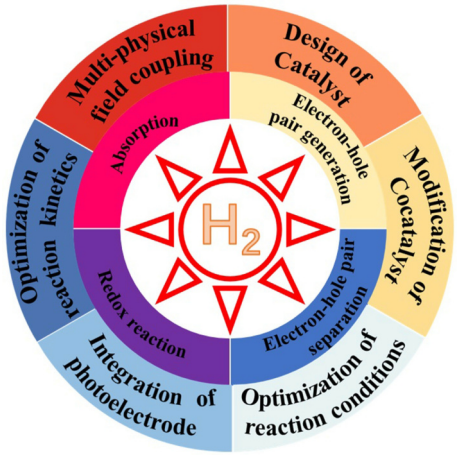

This paper presents a comprehensive review of photoelectrocatalytic hydrogen production, a sustainable energy technology utilizing solar energy to split water into hydrogen and oxygen. While offering benefits like environmental protection and sustainability, its practical applications are constrained by low photoelectric water splitting efficiency. The paper explores the technology's principles, catalyst materials, reaction mechanisms, production efficiency, reaction conditions, and optimization. Detailed discussions on efficient catalysts and strategies for improving hydrogen production rate, including catalyst/co-catalyst utilization and integrated reaction condition optimization, are provided. The paper serves as a theoretical and practical guide for related hydrogen generation research.

A new opportunity for biomass-derived carbon in highly stable Li-O_2 battery: A review

Guanjun Liu, Shaojie Qin, Xiping Zhang, Dan You, Yanjia Zhang, Xiaoyuan Zeng, Yiyong Zhang, Ziyi Zhu*, Yingjie Zhang*, and Xue Li*

National and Local Joint Engineering Research Center of Lithium-ion Batteries and Materials Preparation Technology, Key Laboratory of Advanced Battery Materials of Yunnan Province, Faculty of Metallurgical and Energy Engineering, Kunming University of Science and Technology, Kunming 650093, China

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This review focused on evaluating the innovative research on the high-value utilization of biomass for Li-O_2 battery.

Achilles' heel of single atom catalysts towards practical PEMFC application: Degradation mechanisms and regulatory strategies

Han Guo[1], Peng Zhang[1,*], Siying Huang[1], Min Li[1], Guangxun Sun[1], Jiaye Li[1], Yan Lin[2,*], Bin Liu[1], and Yuan Pan[1,*]

[1] State Key Laboratory of Heavy Oil Processing, China University of Petroleum (East China), Qingdao 266580, China
[2] College of Energy Storage Technology, Shandong University of Science and Technology, Qingdao 266590, China

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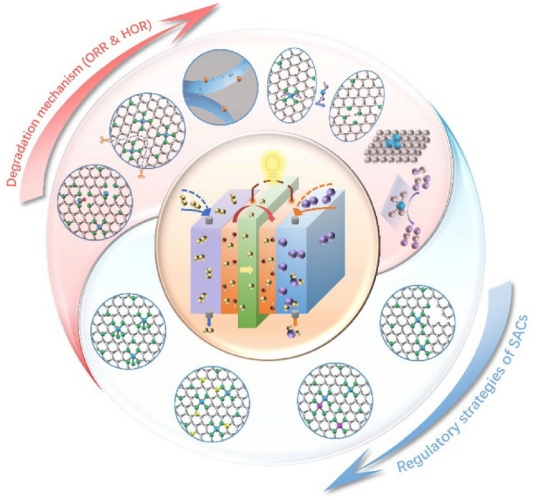

In this paper, the research progress, degradation mechanisms and regulation strategies of single-atom catalysts for proton exchange membrane fuel cells are reviewed.

Graphene–MXene van der Waals heterostructures for high-performance supercapacitors

Suraj Kumar[1], Priyakshi Bora[1], Parimal Chandra Bhomick[2], Dinesh Rangappa[3,*], and Dipak Sinha[1,*]

[1] Department of Chemistry, Nagaland University, Lumami Campus, Zunheboto, Nagaland-798627, India
[2] Department of Chemistry, St. Joseph University, Chümoukedima, Nagaland-797115, India
[3] Department of Applied Sciences (Nanotechnology), Centre for Post-Graduate Studies, Visvesvaraya Technological University, Muddenahalli, Karnataka-562101, India

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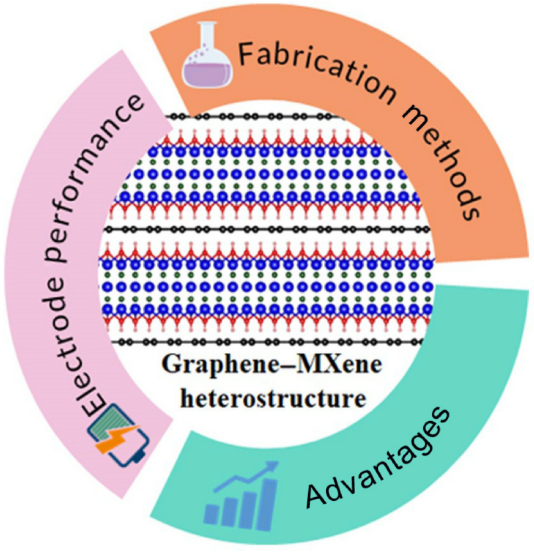

This review examines graphene–MXene heterostructures for supercapacitor electrodes, focusing on energy storage potential, fabrication progress, commercial challenges, and future research directions.

Advances in covalent organic frameworks for photocatalytic CO_2 reduction: Strategies and future perspectives

Muhammad Kashif Aslam[1,*], Iftikhar Hussain[3], Ali H. Al-Marzouqi[1,*], and Maowen Xu[2,*]

[1] Department of Chemical and Petroleum Engineering, College of Engineering, United Arab Emirates University, Al Ain 15551, Abu Dhabi, United Arab Emirates
[2] Chongqing Key Laboratory of Battery Materials and Technologies, School of Materials and Energy, Southwest University, Chongqing 400715, China
[3] Department of Mechanical Engineering, City University of Hong Kong, 83 Tat Chee Avenue, Kowloon, Hong Kong, China

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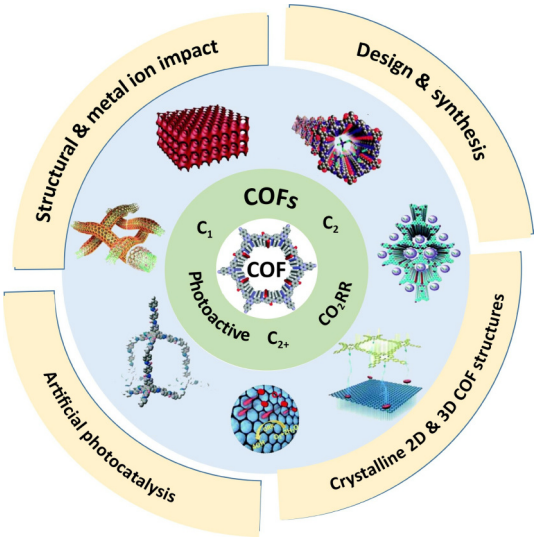

Covalent organic frameworks (COFs), a novel class of crystalline porous materials characterized by high porosity, large surface area, low density, and robust covalently bonded structures, hold immense potential in the field of photocatalytic CO_2 reduction.

AIMS & SCOPE

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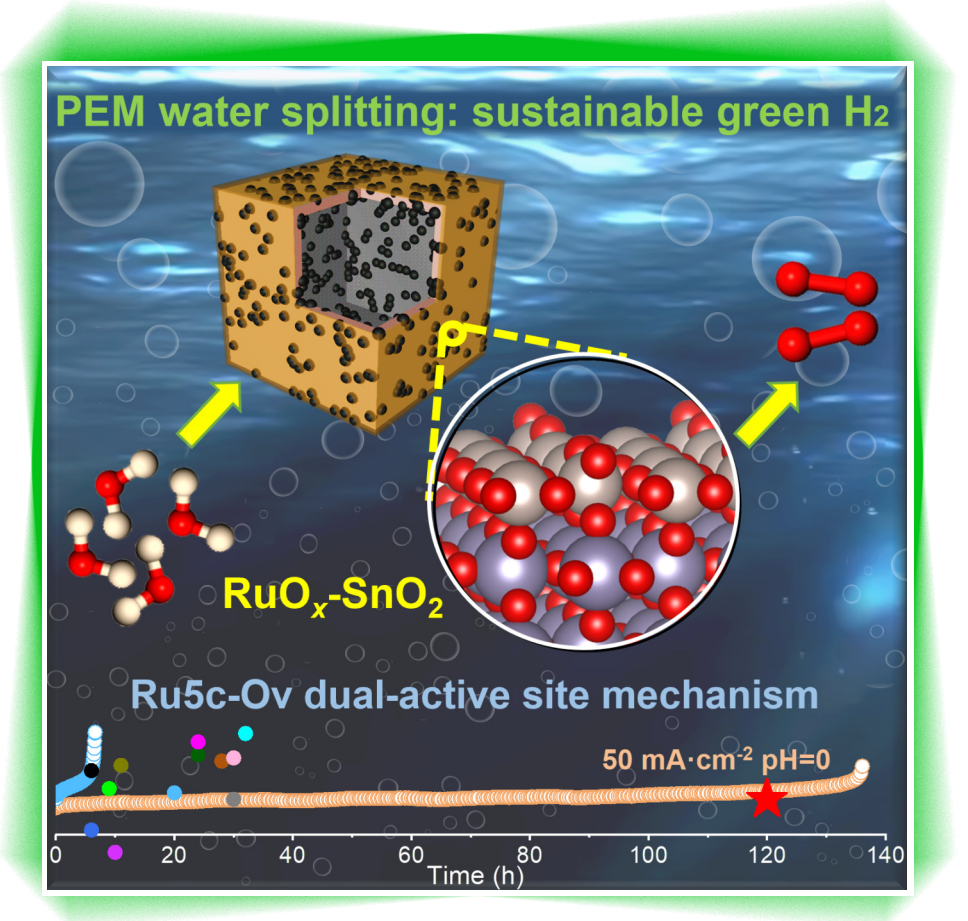

RuO_x clusters anchored on self-assembled SnO_2 cubic nanocage for boosting sustainable acidic water oxidation

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