

Journal of Materials Chemistry A

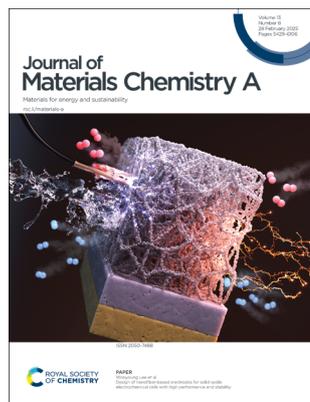
Materials for energy and sustainability

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Inside cover

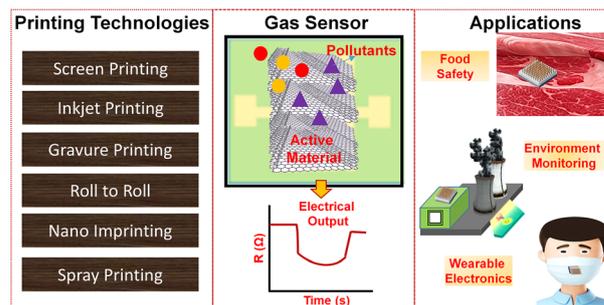
See Jaephil Cho, Hyungyeon Cha *et al.*, pp. 5599–5605. Image reproduced by permission of Hyungyeon Cha from *J. Mater. Chem. A*, 2025, **13**, 5599.

REVIEWS

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Advances in gas sensors using screen printing

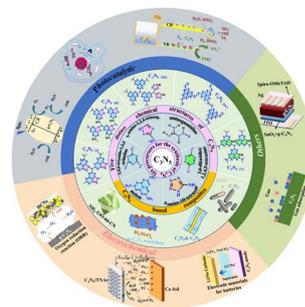
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5498

The rise of two-dimensional covalent C_3N_5 : a molecular perspective

Xuemei Xiao, Xiaoman Ye, Zhijing Wu, Yu Tan,* Xin Wu* and Sheng Liu*



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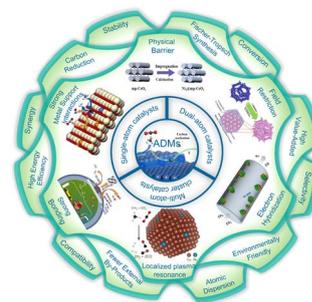


REVIEWS

5530

Atomically dispersed metal catalysts for methane dry reforming

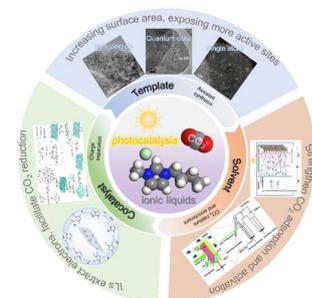
Yuteng Jia, Shaowen Wu,* Peng Qiu,* Lingxin Meng and Tianyu Zhu



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Understanding the roles of ionic liquids in photocatalytic CO₂ reduction

Yun Zhao, Huihu Wang,* Lei Zeng* and Limin Huang*

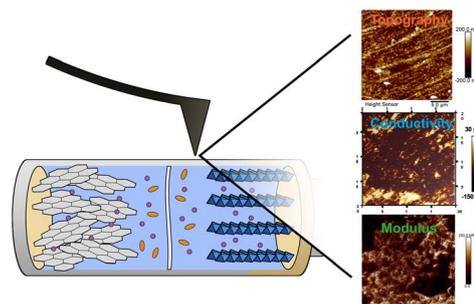


PERSPECTIVE

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Recent advances in characterization of rechargeable battery materials via scanning probe microscopy

Joshua A. Russell, Paul H. Davis, Corey M. Efav and Hui Xiong*

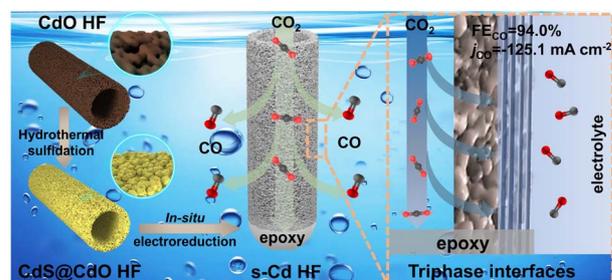


COMMUNICATION

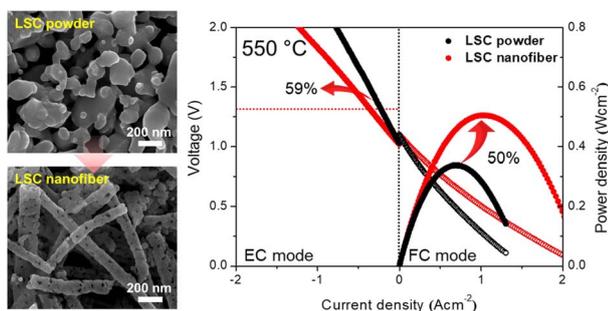
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A reconstructed, surface S-coordinated gas-penetrable Cd hollow fiber for selective CO₂ electroreduction to CO at high current density

Zhe Meng, Yongxing Sun, Yuyu Wang, Jinyu Ma, Fang Wang,* Guoqiang Wu, Kang Wang, Zhengguo Zhang and Shixiong Min*



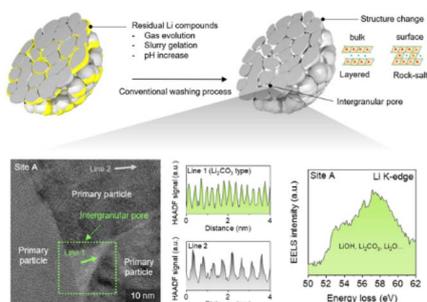
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Design of nanofiber-based electrodes for solid oxide electrochemical cells with high performance and stability

Seungwoo Han, Hyun Sik Yoo and Wonyoung Lee*

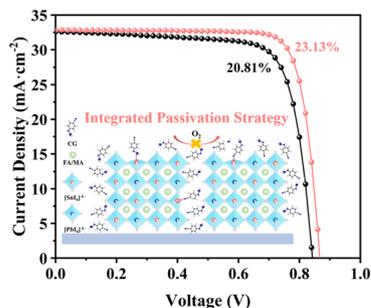
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Identifying the nanostructure of residual Li in high-Ni cathodes for lithium-ion batteries

Wooyoung Jin, Yujin Kim, Haeseong Jang, Yehyeon Gu, Namhyung Kim, Hyomyung Lee, Junhyeok Kim, Sinho Choi, Kyu-Nam Jung, Ki-Hun Nam, Jaephil Cho* and Hyungyeon Cha*

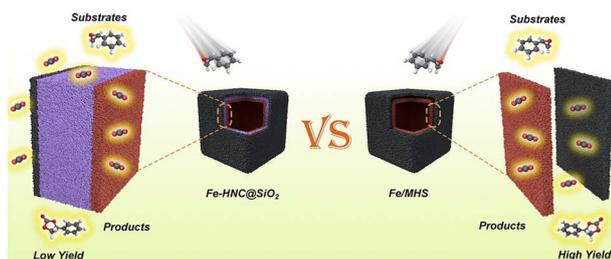
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Integrated passivation strategy using multifunctional additives for tin–lead mixed perovskite solar cells

Dong He, Gongcheng Zhou, Zeyu Niu, Guoqiang Guo, Tianle Cheng, Gangsen Su, Haojie Chen, Siyuan Tang, Jiacheng He, Wenhua Zhang and Zhubing He*

5615



Atomically dispersed iron sites on a multi-shelled hollow structure for highly efficient CO₂ fixation

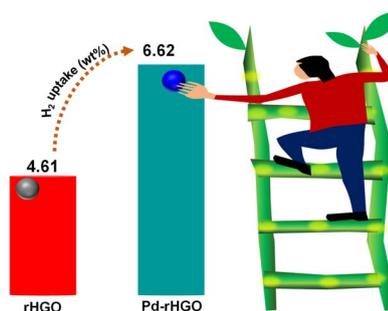
Changsong Shi, Ruiming Xu, Ting Suo, Xiang Shi and Ruirui Yun*



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Palladium-decorated unconventional graphene oxide for unprecedented hydrogen storage

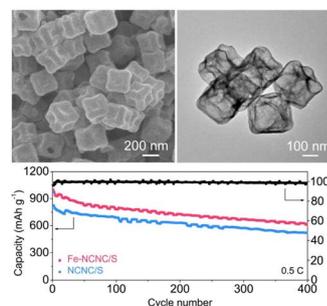
Shankar Ghotia, Seemita Banerjee, Asheesh Kumar, Neeraj Dwivedi, Avanish Kumar Srivastava and Pradip Kumar*



5632

Oversaturated iron sites on mesopore-rich carbon nanocages boost adsorption and transformation of polysulfides for lithium–sulfur batteries

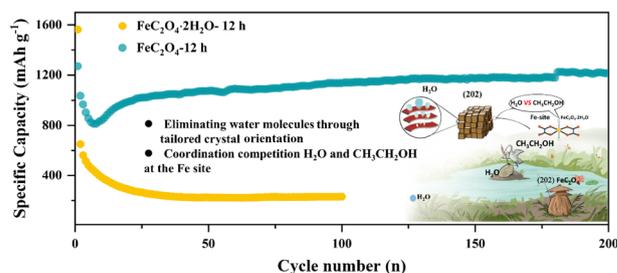
Zhuo Zhu, Guilan Fan, Hai Huang, Yan Guo, Xiaojun Gu* and Jun Song Chen*



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Eliminating water molecules through tailored crystal orientation to enhance the lithium storage capacity of iron oxalate

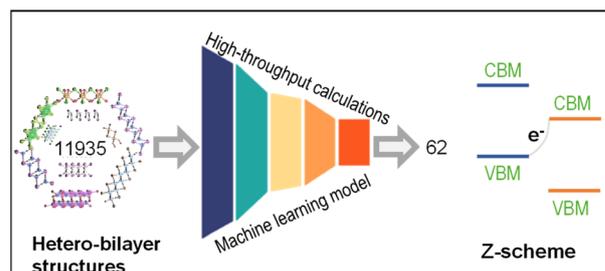
Geng Gao, Jian Tang, Shaoze Zhang, Bo Jin, Yajie Yuan, Yixing Zeng, Yanqiu Xu, Qing Zhao, Keyu Zhang, Junxian Hu, Yin Li and Yaochun Yao*



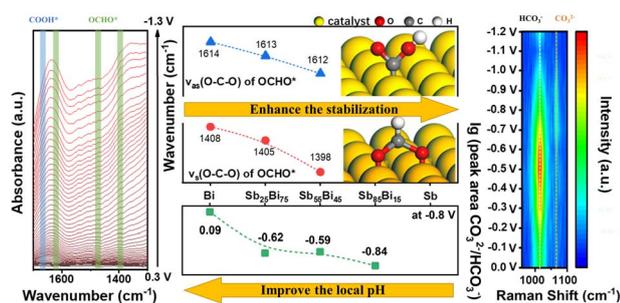
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High-throughput computation and machine learning screening of van der Waals heterostructures for Z-scheme photocatalysis

Xiaoqing Liu, Yifan Li, Xiuying Zhang, Yi-Ming Zhao, Xian Wang, Jun Zhou, Jiadong Shen, Miao Zhou* and Lei Shen*



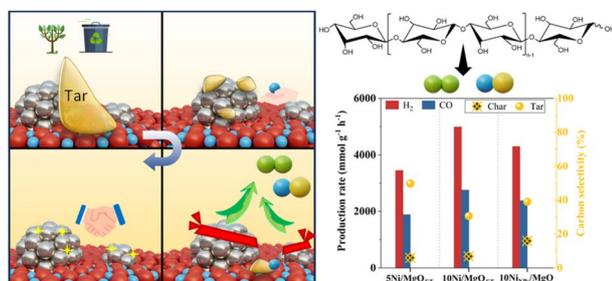
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Mechanistic understanding of the antimony–bismuth alloy promoted electrocatalytic CO₂ reduction to formate

Jiameng Sun, Wanfeng Yang, Bin Yu, Yalong Liu, Yong Zhao,* Guanhua Cheng and Zhonghua Zhang*

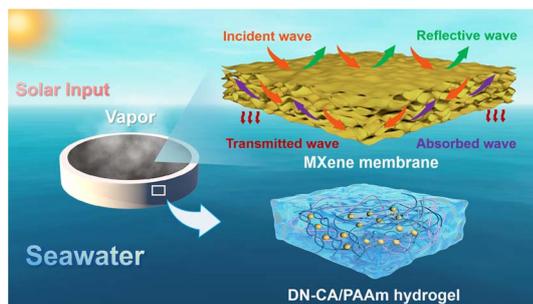
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Unraveling the light-promoted synergy between highly dispersed Ni and Ni nanoparticles for efficient photothermocatalytic cellulose steam reforming to syngas

Mengqi Zhong, Yuanzhi Li,* Jichun Wu, Cong Ji, Qing Du, Qianqian Hu and Lei Ji

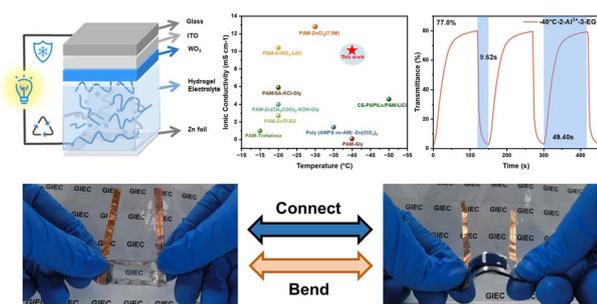
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A self-healing, deformation-resistant MXene double-network hydrogel for stable solar-driven interfacial evaporation

Ruiqi Zhao, Xushuai Chen, Xi Chen,* Panpan Zhang, Chunjia Luo, Pengfei Zhang,* Min Chao and Luke Yan*

5694



Anti-freezing polyacrylamide hydrogel electrolyte for rapid response self-powered electrochromic devices

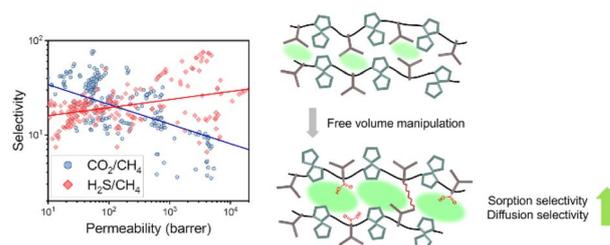
Rui Ge, Xiudi Xiao,* Lirong Chen, Chengyu Jiang, Youliang Nie, Yanqing Zhu, Liuwen Zhong and Gang Xu*



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Enhancing acid–gas separations using free volume manipulation for microporous poly(arylene ether)s

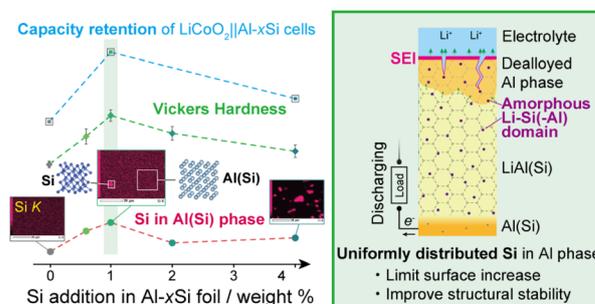
Taigyu Joo, Yifan Wu, Tae Hoon Lee, Pablo A. Dean, Wan-Ni Wu, Timothy M. Swager and Zachary P. Smith



5723

Enhancing the durability of aluminium-foil anodes in rechargeable lithium batteries *via* uniformly distributed alloy addition in the matrix phase

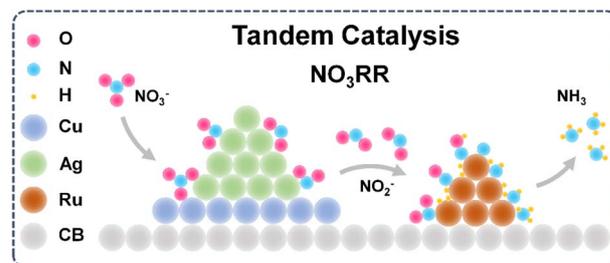
Hongyi Li,* Shohei Nishimura, Weiqi Liu, Norihiko L. Okamoto, Shingo Matsumoto, Yuki Nakata, Hiroaki Hoshikawa, Toshiaki Kumagai, Takitaro Yamaguchi and Tetsu Ichitsubo*



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Boosting electrocatalytic nitrate reduction to ammonia with a Cu/Ag-Ru tandem catalyst at industrial-scale current density

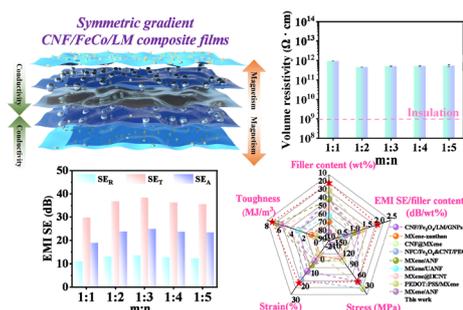
Ru Jia, Xiaoxue Zhang, Li Gan, Muhammad Tahir, Zhen-Feng Huang,* Lun Pan, Ruijie Gao, Chengxiang Shi, Xiangwen Zhang, Guidong Yang and Ji-Jun Zou*



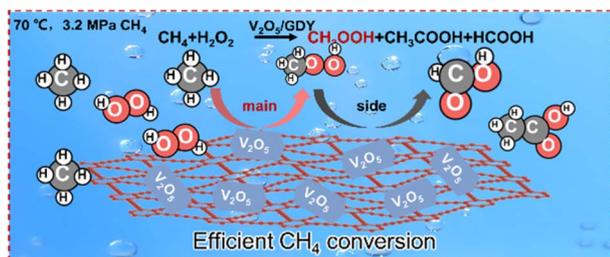
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A symmetric gradient structure enables robust CNF/FeCo/LM composite films with excellent electromagnetic interference shielding and electrical insulation

Song Yang, Maofei Du, Ying Zhang, Yuhan Wang, Ting Gu* and Fei Liu*



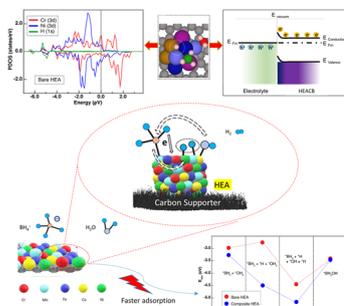
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Construction of the sp-C–O–V interface for selective conversion of methane to methyl hydroperoxide under mild conditions

Fanle Bu, Jiayu Yan and Yurui Xue*

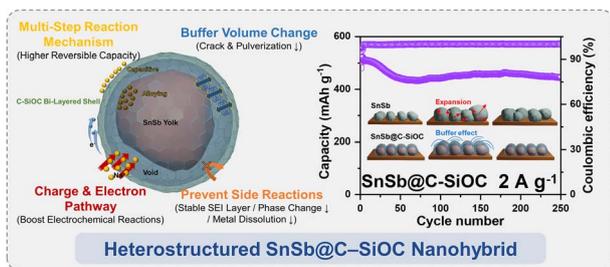
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Comprehensive insights into hydrolysis-mediated hydrogen production using high-entropy quintuple alloy-grafted carbon black

Gokul Raj, Ravi Nandan, Soumen Midya, Kanhai Kumar, Abhishek Kumar Singh and Karuna Kar Nanda*

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Rational design for enhanced mechanical and kinetic properties of SnSb-based yolk–shell heterostructure as long cycle-life, high-rate Na-ion battery anode

Jong Min Im, Hyojun Lim, Hyunjin Kim, Yun Chan Kang, Yoon Hwa and Sang-Ok Kim*

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Multifunctional AgNWs–Fe₃O₄/ANF composite films with a Janus-like structure for outstanding electromagnetic interference shielding and thermal management

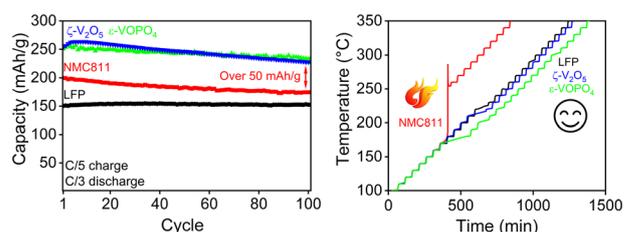
Jiyan Wei, Xinxin Cai, Jiwen Hu and Shudong Lin*



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How thermally stable are vanadium cathode Li-ion cells?

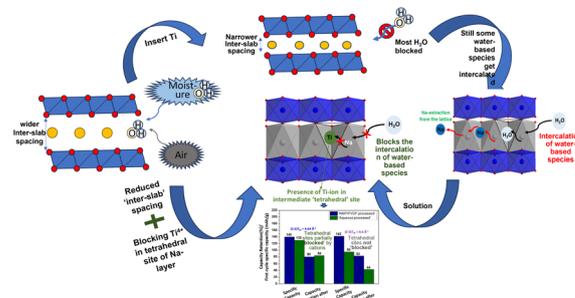
Fenghua Guo, Hui Zhou, Jonathan Miller, Brian J. Schultz, Leonardo Gobbato and M. Stanley Whittingham*



5807

Specific crystallographic site occupancy induced water stability: towards facilitating 'aqueous processing' of 'layered' Na-transition metal oxide cathodes for Na-ion batteries

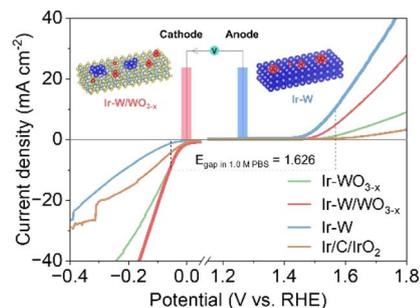
Bachu Sravan Kumar, Adrija Goswami, Rahul Kumar, Xiaoran Zheng, Anil K. Paidi, Vinod K. Paidi, Brijesh Yadav, Ik Seon Kwon, Kug-Seung Lee, Docheon Ahn, Abhijit Chatterjee, Neeraj Sharma and Amartya Mukhopadhyay*



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Lewis acidic W/WO_{3-x} heterostructure-coupled Ir catalysts with low Ir loading for efficient pH-universal water splitting

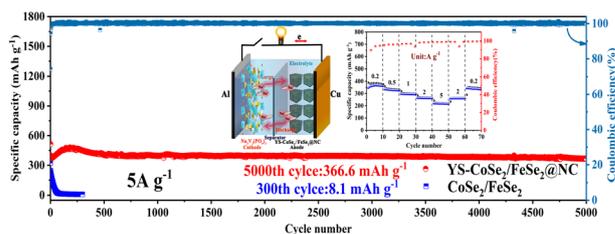
Wenjie Shao, Yiming Zhang, Rui Yan, Tian Ma* and Shuang Li*



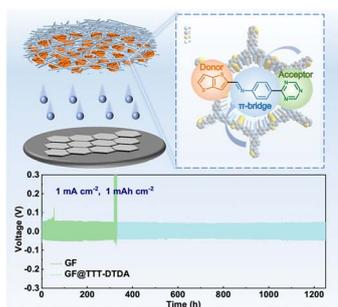
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Fabrication of CoSe₂/FeSe₂ heterostructures with a stable solid-electrode interphase film and low surface activation energy for Na-ion batteries

Zhiya Lin, Zhilong Wu, Maoxin Yu, Hai Jia, Kaiqiang Zhou, Xiaohui Huang* and Shaoming Ying*



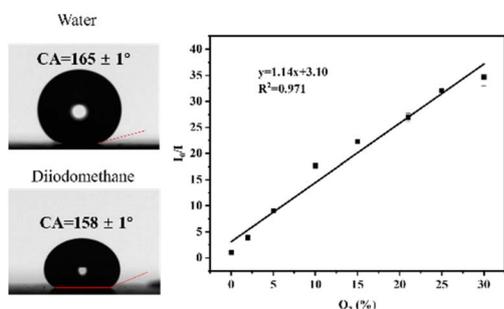
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A multicomponent donor- π -acceptor covalent organic framework as a nanoporous cation-selective separator for durable aqueous zinc ion batteries

Ling Chen, Tiancun Liu, Xiao-Meng Lu, Weiwei Sun, Yang Wu, Yifan Zhang, Chao Yang and Yong Wang*

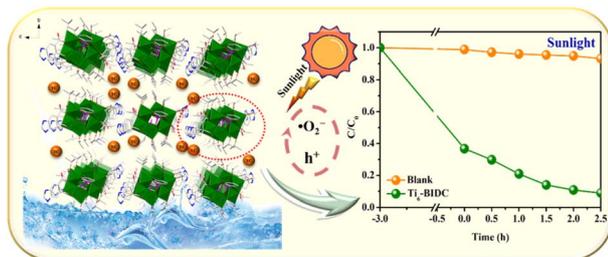
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Superhydrophobic and oleophobic luminescent composite materials for oxygen sensing in fuel-laden atmospheres

Yawen Zhao, Fajin Qu, Zhiwen Wang, Yanyi Wang and Chusheng Chen*

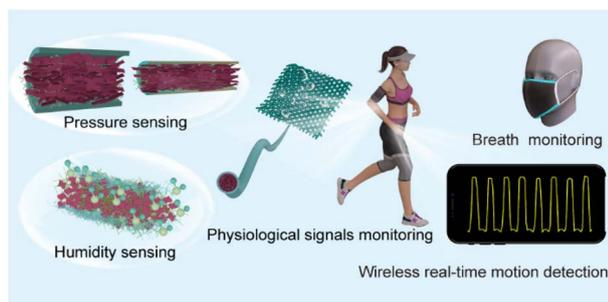
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Carboxylate-functionalized polyoxo-titanium clusters for adsorption/solar photocatalytic synergistic tetracycline degradation

Shu-Han Wang, Ming Du, Hui-Li Guo, Hui-Yuan Chen, Jing-Yu Pang,* Dong-Bin Dang* and Yan Bai*

5870



A fiber-shaped sensor constructed by coaxial wet-spinning for dual-mode sensing

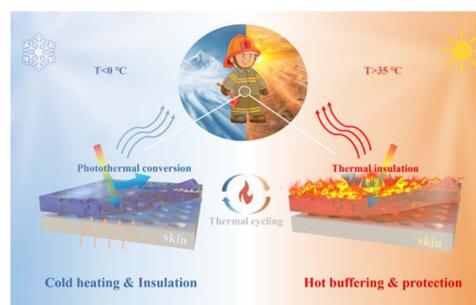
Duixin Ma, Huayang Fang, Jianping Sun* and Tao Jiang*



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Hierarchically porous and flexible BN/Co-MOF aerogel encapsulated paraffin for efficient dual-thermal insulation

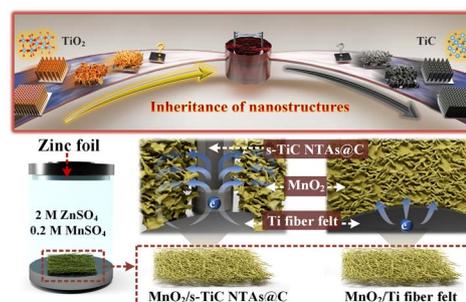
Siyue Hui, Huanzhi Zhang,* Guangpeng Xu, Junhao Zhang, Fen Xu, Lixian Sun,* Xiangcheng Lin, Lei Ma, Hongliang Peng, Bin Li, Erhu Yan and Federico Rosei



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Electrochemically directed synthesis of TiC nanotube arrays for aqueous zinc-ion batteries

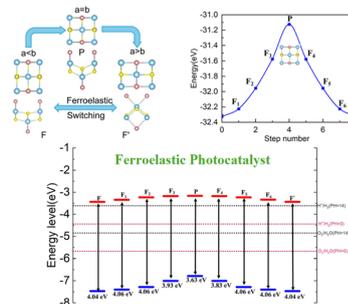
Tongxiang Ma,* Xiangyan Chen and Qingyu Li



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Unveiling the photocatalytic potential of two-dimensional ferroelastic LuSX monolayers for efficient water splitting: a first-principles discovery

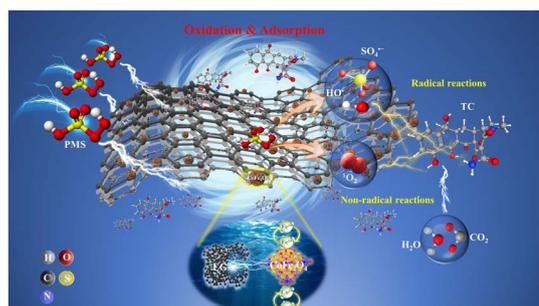
Fengxian Ma, Xiaoxia Liu, Zhen Gao, Zibo Chen, Yalong Jiao* and Zhongfang Chen*



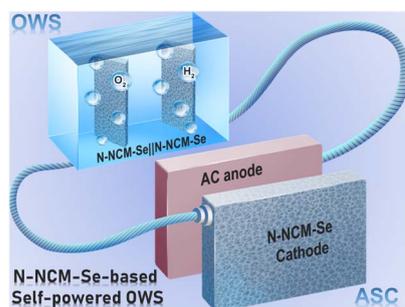
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Optimization of the CoFe₂O₄ electronic structure using reticulated expanded graphite to accelerate non-radical activation of peroxymonosulfate for efficient antibiotic degradation in wastewater

Qi Zhao, Weiguang Li,* Longyi Lv, Shangfeng Jiang, Jingyi Zhang, Caihua Bai and Xuhui Wang*



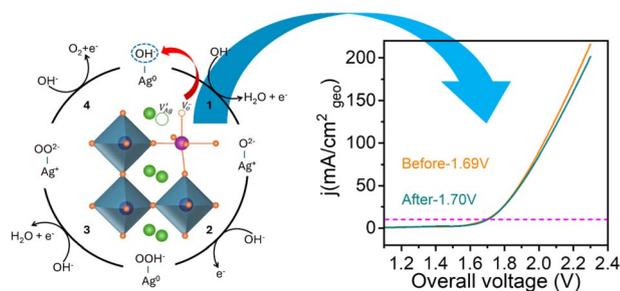
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Optimized trimetallic selenide heterostructures as high-performance trifunctional electrodes for self-sustained hydrogen production

Muhammad Mushtaq, Malcolm Koroma, Shu Jiang, Selvam Mathi, Meilian Tu, Zeba Khanam, Yu-Wen Hu,* Jianqiu Deng* and M.-Sadeeq Balogun*

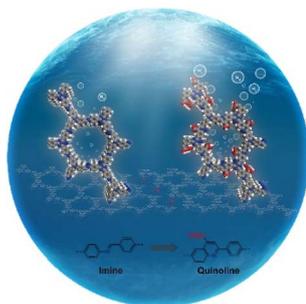
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Enhancing the electrochemical catalytic performance of novel bifunctional oxygen vacancy-enriched silver niobate (AgNbO_3) through electrochemical activation

Deepak Rajaram Patil, Harish S. Chavan, Ah-yeong Lee, Geon Lee, Jungho Ryu, Younggon Son and Kiyoung Lee*

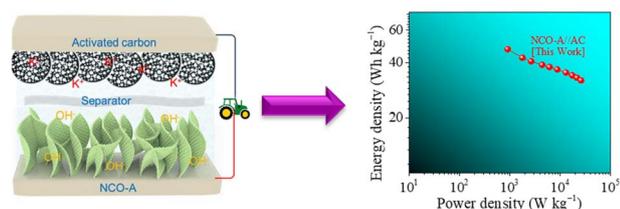
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Synergistic linkage engineering in covalent organic frameworks for boosting photocatalytic hydrogen evolution

Changsheng Du, Tongtong Jia, Wenjing Na, Haojie Huang, Zewen You, Yunqi Liu, Wenjing Song and Jianyi Chen*

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MOF-derived nickel cobaltite: a pathway to enhanced supercapacitor performance

Periyasamy Sivakumar, Jayaraman Balamurugan, C. Justin Raj, Palaniappan Subramanian, Antonysamy Dennyson Savariraj, Ramu Manikandan and Hyun Jung*

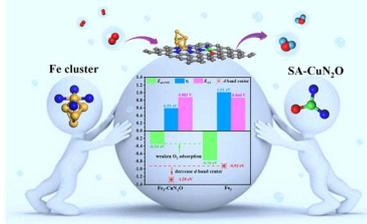


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Copper single atom-modulated functionalization of iron clusters on a porous carbon nanosheet for the oxygen reduction reaction

Lingmin Wu, Yinghua Wang, Chunfeng Shao, Liming Wang and Baitao Li*

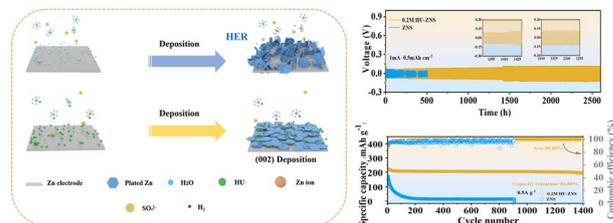
Significant functionalization of Fe₃ clusters with CuN₂O single atom, compared with CuN₄ and FeN₄, in decreasing d-band center and weakening the oxygen adsorption



5987

Multifunctional hydroxyurea additive enhances high stability and reversibility of zinc anodes

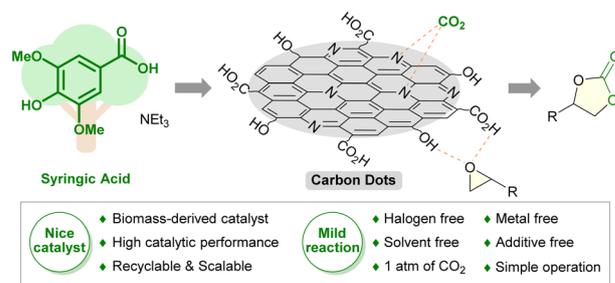
Ruizhe Zhang, Zhiyong Liao, Yongbo Fan,* Lixin Song, Jiayi Li, Zhuo Zhang, Peizhi Dong, Zexue Lin, Ning Yang, Qingfeng Zhang and Huiqing Fan*



6000

A metal-, solvent-, halogen-, and additive-free catalysis for CO₂ fixation by carbon dots

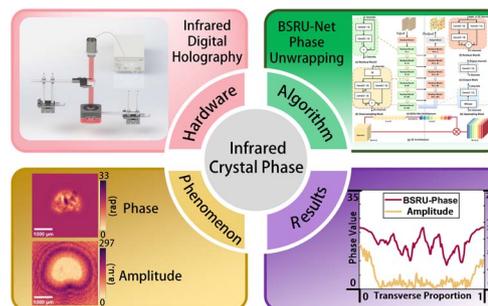
Tao Zhang, Ruijia Wang, Wei Li, Shujun Li, Bing Tian,* Shouxin Liu* and Zhijun Chen*



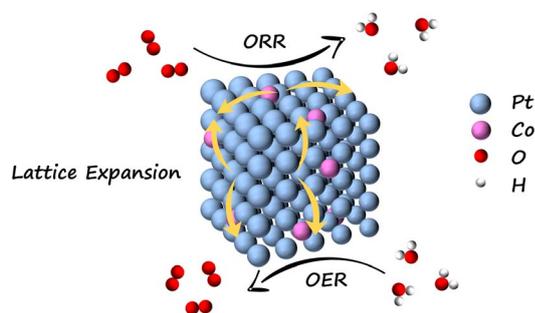
6009

Insights into infrared crystal phase characteristics based on deep learning holography with attention residual network

Haochong Huang,* Haichao Huang, Zhiyuan Zheng and Lu Gao



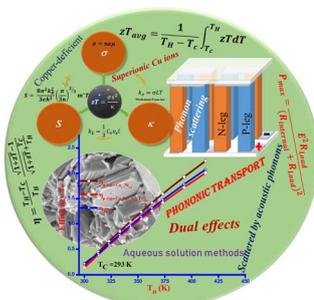
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Trace cobalt-inserted platinum lattice gap to enable bifunctional oxygen electrocatalysis

Jie Yang, Shilong Song, Zhanwei Chen, Bo Zhang, Yuyu Guo,* Ying Guo* and Hepeng Zhang*

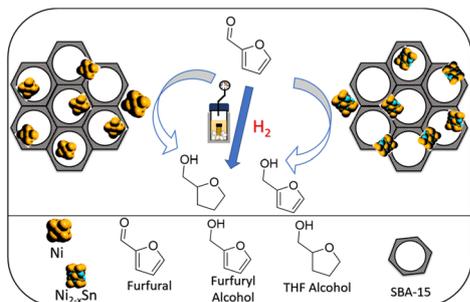
6027



Synergistic enhancement of Cu₂Se thermoelectric properties via Te and S co-doping: aqueous synthesis and cold-press sintering for power generation

Vinothkumar Lourdhusamy, Immanuel Paulraj, Veera Prabu Kannan and Chia-Jyi Liu*

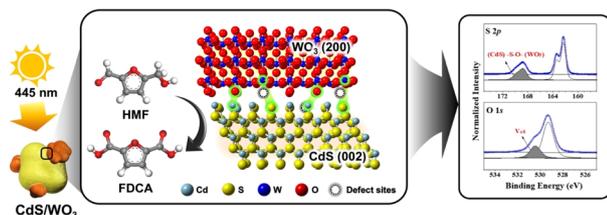
6042



Metal deficiency tuned charge transfer in intermetallic Ni_{2-x}Sn ($x = 0.37-0.65$) enhances selective conversion of furfural to furfuryl alcohol towards the theoretical limit

Arjun Cherevotan, Ashutosh Kumar Singh, Anish Yadav, Raghu V. Maligal-Ganesh, Jithu Raj, Anu Pulparambil, Devender Goud, Chathakudath P. Vinod and Sebastian C. Peter*

6049



In situ study of CdS/WO₃ and CdS/SnO₂ heterostructures: comparison of photocatalytic activity behavior

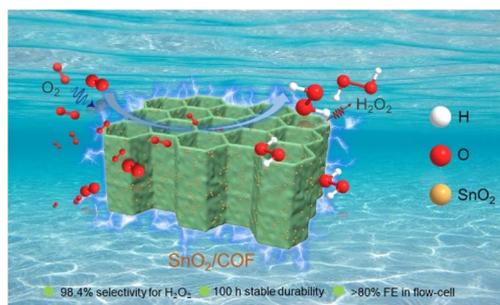
Hyejin Yu, Dung Thanh Hoang, Hyun Sung Kim* and Hangil Lee*



6059

Self-assembled SnO₂/COF catalysts for improved electro-synthesis of hydrogen peroxide

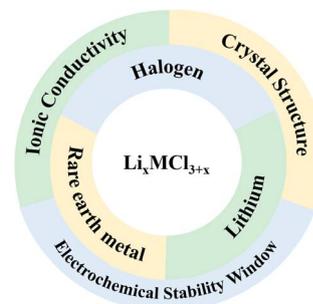
Guoliang Wang, Zhikang Bao, Yuanan Li, Yabing Wang, Xuejiao Cui, Haochong Zhong, Wenjuan Fang* and Jianguo Wang*



6067

Composition regulation of ternary rare-earth halide solid-state electrolytes and its influence on their ionic conducting and electrochemical properties

Anyi Zheng, Liang Luo, Linwei Li, Zhouqing Jiang, Shengming Ma and Jinqiu Yu*



6075

Simultaneously improved reversibility and hydrogen production of solid oxide cells through infiltrating air electrode

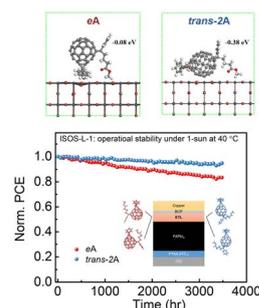
Yueying Fan,* Yun Chen, Richard Pineault, Harry Abernathy,* Xueyan Song and Thomas Kalapos



6089

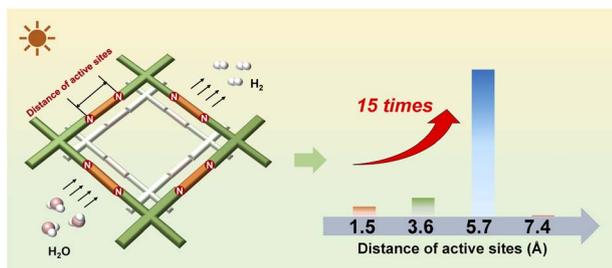
Single enantiomer chiral fullerenes enable interfacial toughening of perovskite solar cells

Wenda Shi, Xin Wang, Ying Jiang, Mengyao Zhang, Sihan Du, Qiang Zhuang, Xueyan Hou, Yuzhang Du, Ruizhe Xing, Jin Liang, Zhen Yu, Kailiang Ren, Xiaoming Zhao, T. John S. Dennis, Xiangnan Sun,* Matthew J. Fuchter* and Jie Kong*



PAPERS

6095



The enhancement of photocatalytic hydrogen evolution in imine-linked pyrene-based covalent organic frameworks through the regulation of active site distances

Jiawen Zong, Huanyu Liu, Wei Lian, Lu Dai* and Pengfei Li*

CORRECTIONS

6102

Correction: Atomically dispersed cobalt on graphitic carbon nitride as a robust catalyst for selective oxidation of ethylbenzene by peroxymonosulfate

Jiaquan Li, Shiyong Zhao,* Shi-Ze Yang, Shaobin Wang, Hongqi Sun, San Ping Jiang,* Bernt Johannessen and Shaomin Liu*

6103

Correction: Mixed metal–antimony oxide nanocomposites: low pH water oxidation electrocatalysts with outstanding durability at ambient and elevated temperatures

Sibimol Luke, Manjunath Chatti, Asha Yadav, Brittany V. Kerr, Jiban Kangsabanik, Tim Williams, Pavel V. Cherepanov, Bernt Johannessen, Akshat Tanksale, Douglas R. MacFarlane, Rosalie K. Hocking,* Aftab Alam,* Aswani Yella* and Alexandr N. Simonov*

6104

Correction: Enhancing the durability of aluminium-foil anodes in rechargeable lithium batteries *via* uniformly distributed alloy addition in the matrix phase

Hongyi Li,* Shohei Nishimura, Weiqi Liu, Norihiko L. Okamoto, Shingo Matsumoto, Yuki Nakata, Hiroaki Hoshikawa, Toshiaki Kumagai, Takitaro Yamaguchi and Tetsu Ichitsubo*

