

# Journal of Materials Chemistry A

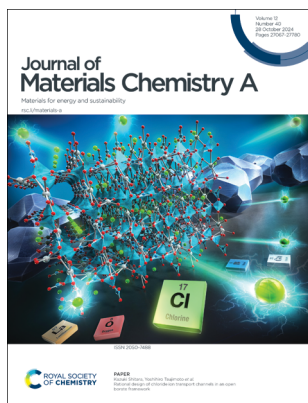
Materials for energy and sustainability

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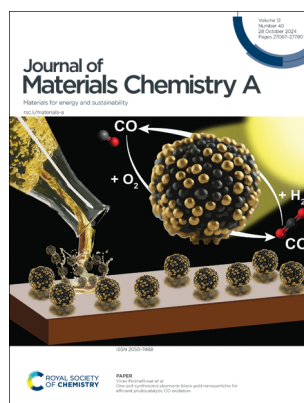
## IN THIS ISSUE

ISSN 2050-7488 CODEN JMCAET 12(40) 27067–27780 (2024)



### Cover

See Kazuki Shitara, Yoshihiro Tsujimoto *et al.*, pp. 27229–27234. Image reproduced by permission of Yoshihiro Tsujimoto from *J. Mater. Chem. A*, 2024, 12, 27229.



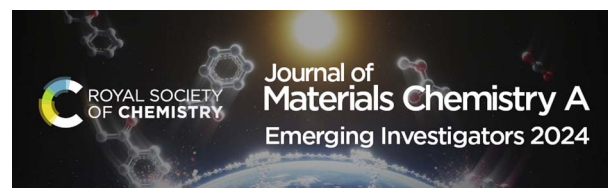
### Inside cover

See Vivek Polshettiwar *et al.*, pp. 27235–27245. Image reproduced by permission of Vivek Polshettiwar from *J. Mater. Chem. A*, 2024, 12, 27235.

## PROFILE

27086

Contributors to the *Journal of Materials Chemistry A* Emerging Investigators 2024 collection

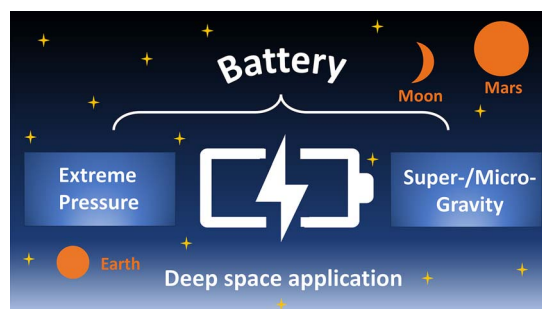


## HIGHLIGHT

27123

Insight into rechargeable batteries under extreme pressure and gravity for deep space exploration

Yi He, Wenxu Shang\* and Peng Tan\*



**GOLD  
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ACCESS**

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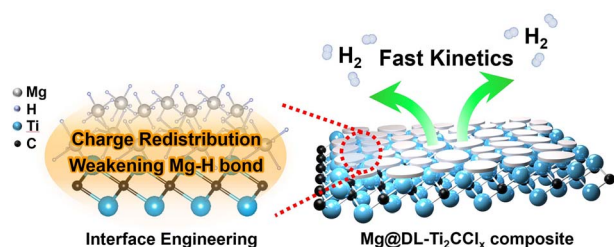
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## COMMUNICATIONS

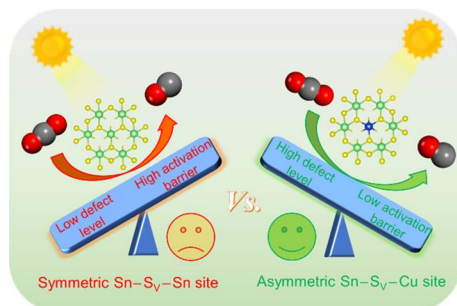
27212



### Interfacial charge transfer driven by surface termination-controlled Ti<sub>2</sub>C MXene for enhanced hydrogen storage in magnesium

Min Gyu Kim, ShinYoung Kang, Brandon C. Wood and Eun Seon Cho\*

27220

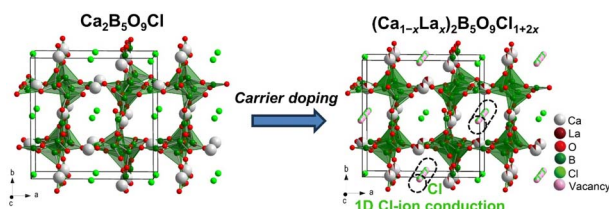


### Breaking the symmetry of sulfur defect states via atomic substitution for enhanced CO<sub>2</sub> photoreduction

Yingxin Ma, Haolan Tao, Xuyun Guo, Peinuo Yang, Dan Xing, Valeria Nicolosi, Yu Zhang,\* Cheng Lian\* and Bocheng Qiu\*

## PAPERS

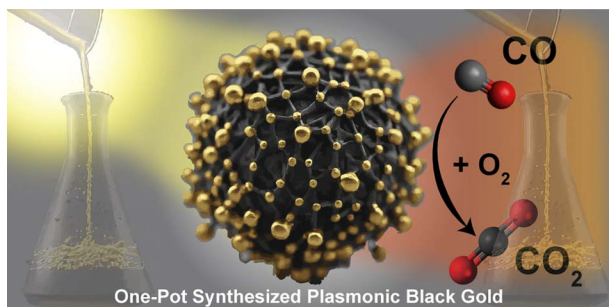
27229



### Rational design of chloride ion transport channels in an open borate framework

Yu Meng, Naoyoshi Nunotani, Kazuki Shitara,\* Yoshitaka Matsushita, Nobuhito Imanaka, Kazunari Yamaura and Yoshihiro Tsujimoto\*

27235



### One-pot synthesized plasmonic black gold nanoparticles for efficient photocatalytic CO oxidation

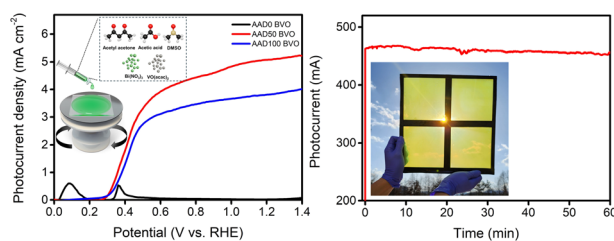
Rishi Verma, Sushma Kundu and Vivek Polshettiwar\*



27246

### Breakthrough in the large area photoanode fabrication process: high concentration precursor solution with solvent mixing and one step spin coating for high PEC performance of BiVO<sub>4</sub>

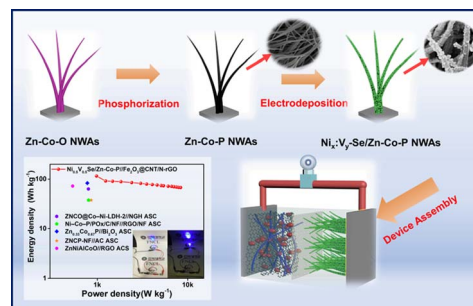
Hoyoung Lee, Gil-Seong Kang, Hanyi Lim, Hyobin Han, Tae Woo Kim, Jun-Hyuk Choi, Dae-Geun Choi, Joo-Yun Jung, Jun-Ho Jeong, Jong Hyeok Park\* and Jihye Lee\*



27257

### A Ni<sub>x</sub>V<sub>y</sub>-Se nanoparticle decorated hierarchical porous Zn-Co-P nanowire array electrode for high energy density asymmetric supercapacitors

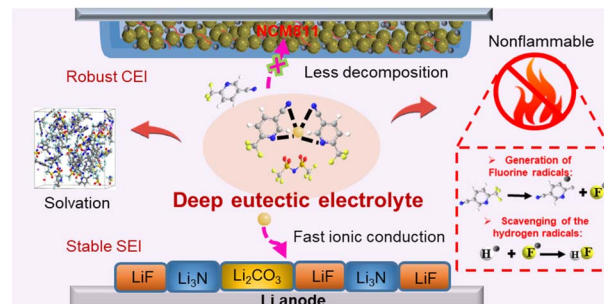
JiuYi Dai, Soram Bobby Singh, Manoj Bollu, Nam Hoon Kim\* and Joong Hee Lee\*



27269

### Fluorine-rich deep eutectic electrolytes enabling robust interphases and nonflammability of high-voltage lithium metal batteries

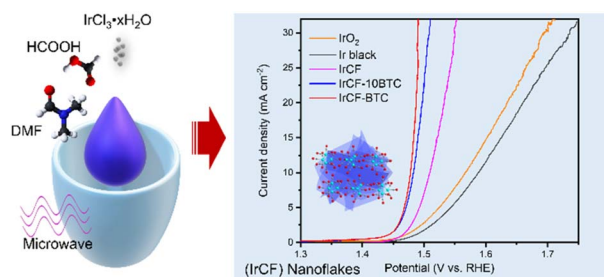
Jun Yang, Mingzi Sun, Rongrong Li, Lijiang Yin, Bolong Huang\* and Xiong Pu\*



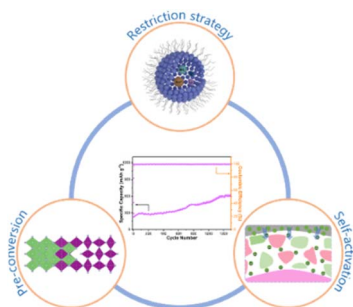
27280

### Ultrathin iridium carbonyl formate for efficient and durable acidic oxygen evolution electrocatalysis

Jian Wei Guo, Fangxin Mao, Song Ru Fang, Hao Yang Lin, Huan Wang, Wen Jing Li, Hai Yang Yuan, Shuang Yang,\* Peng Fei Liu\* and Hua Gui Yang



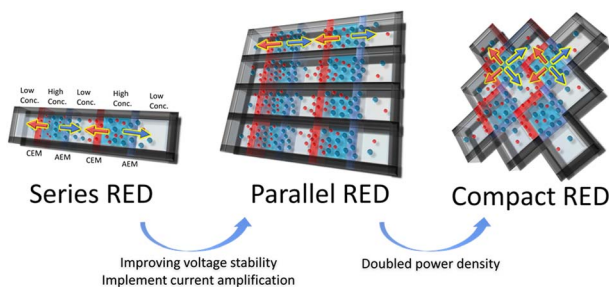
27286



### Insights into the conversion mechanism of the restriction strategy and self-activation enabled high-performance manganese fluoride anodes

Jun Wu, Jiamao Hao, Chengdeng Wang, Haofeng Shi, Fang Zhu, Lu Yang, Zhiming Bai,\* Xiaoqin Yan\* and Yousong Gu\*

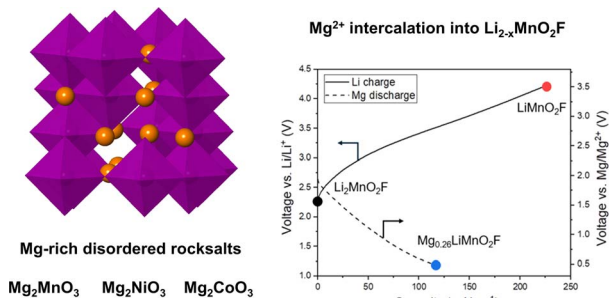
27296



### Four-way diffusion in miniaturised devices of reverse electro dialysis

Sanguk Park, Yunju Kim, Song Yi Yeon and Taek Dong Chung\*

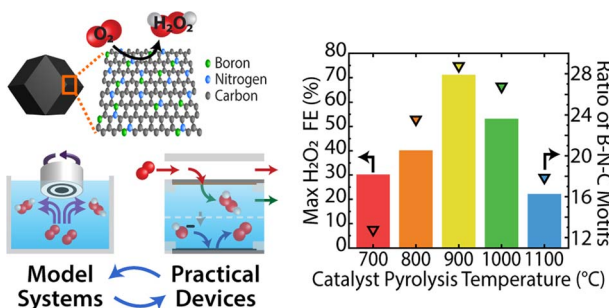
27303



### Mg-rich disordered rocksalt oxide cathodes for Mg-ion batteries

Yuan Quan, Dingqiao Ji, Yi Yuan, Hang Xu, Rui Qi, Sofia De Sousa Coutinho, Sibylle Riedel, Zhirong Zhao-Karger, Lijiang Song, Alexander W. Robertson, Peter G. Bruce and Robert A. House\*

27311



### Efficient electro synthesis of hydrogen peroxide in neutral media using boron and nitrogen doped carbon catalysts

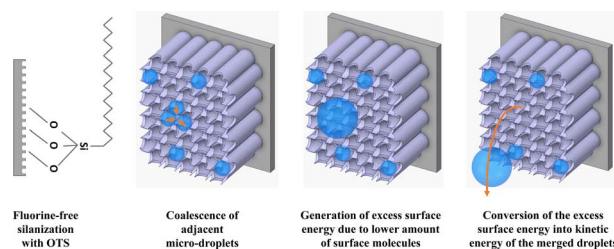
Brianna N. Ruggiero, Xiao Kun Lu, Bingzhang Lu, Adrien E. Deberghes, Dennis Nordlund, Justin M. Notestein and Linsey C. Seitz\*



27327

### Condensation heat transfer enhancement through durable, self-propelling fluorine-free silane-treated anodized surfaces

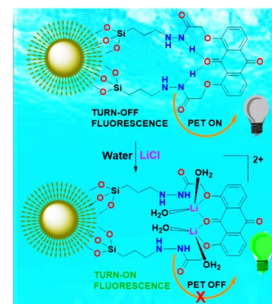
Mahmoud Mahlouji Taheri, Behzad Rezaee, Hossein Pakzad and Ali Moosavi\*



27340

### A regenerative dual-functional platform combining dendritic silica and anthraquinone amide: advancing seawater lithium detection and recovery with biosensing capabilities

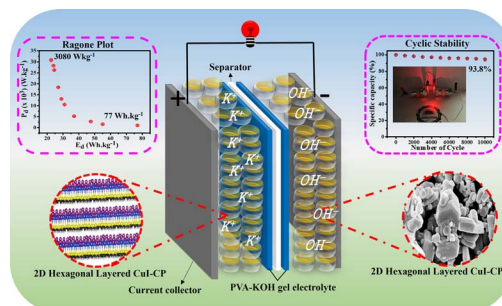
Nishu Choudhary, Sanjay Yadav, Tulsi R. Patel, Padmaja D. Wakchaure, Vasavdutta Sonpal, Bishwajit Ganguly\* and Alok Ranjan Paital\*



27355

### A 2D layered semiconducting (LCu<sub>3</sub>I<sub>3</sub>)<sub>n</sub> coordination polymer for energy storage through dual ion intercalation

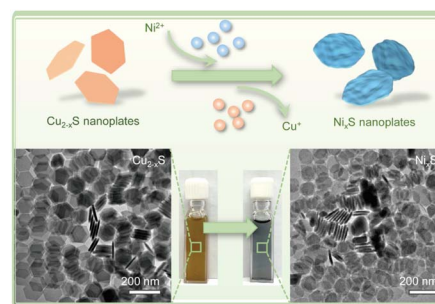
Dilip Pandey, Mayank K. Singh, Shivendu Mishra, Dharendra K. Rai\* and Abhinav Raghuvanshi\*



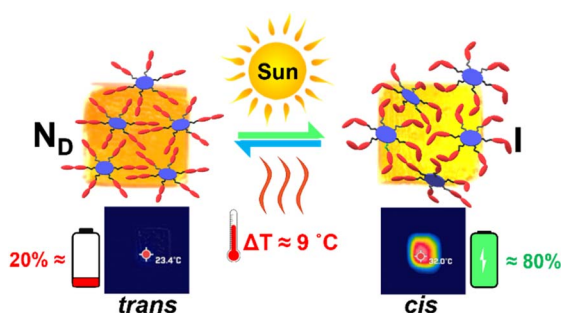
27364

### Strategic cation exchange induced 2D nickel sulphide nanoplates with enhanced oxygen evolution reaction performance

Jiayi Chen, Xiaomin Xu, Rundong Mao, Cuifang Wang, Hsien-Yi Hsu, Zongyou Yin, Mark A. Buntine, Alexandra Suvorova, Martin Saunders, Zongping Shao\* and Guohua Jia\*



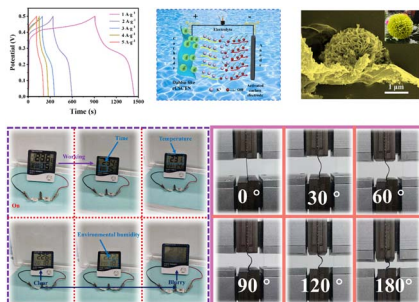
27373



### Sunlight driven *E*–*Z* isomerization of liquid crystals based on hexahydroxytriphenylene nano-templates for enhanced solid-state solar thermal energy storage

Monika Gupta,\* Ashy and Abhinand Krishna KM

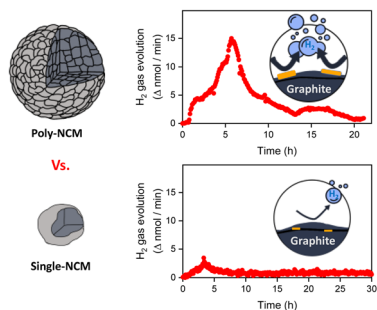
27381



### A flexible asymmetric supercapacitor assembled by dahlia-like core–shell cobalt/tin-based chalcogenide@nickel hydroxide grown on reduced graphene oxide

Huiru Sun, Hanwen Zong, Wenjun Huang, Lejiao Duan, Jingjing Dong, Yuesheng Sun, Zhongqi Lu, Zhihan Yang, Yawen Liu and Jingquan Liu\*

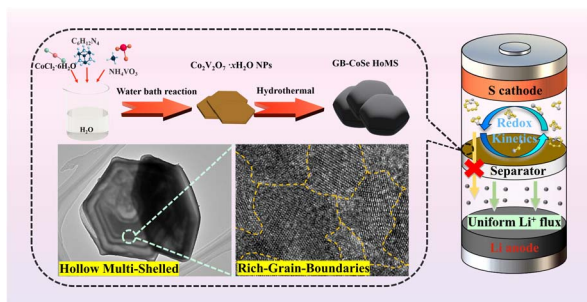
27393



### Mitigating hydrogen gas evolution in high nickel cathodes using single-crystalline NCM particles

Nyung Joo Kong, Jee Ho Ha, Yeon Jeong Hwang, Yujin Kim, Byung Un Hwang, Kyeong-Min Jeong, Jaephil Cho\* and Seok Ju Kang\*

27400



### A grain-boundary-rich cobalt selenide hollow multi-shelled structure as a highly efficient electrocatalyst for lithium–sulfur batteries

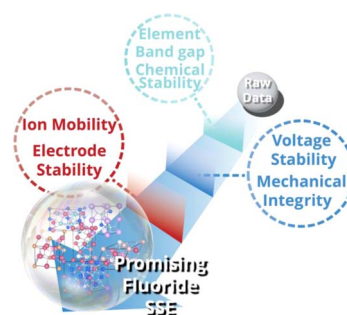
Yuan Yin, Pengcheng Tan, Qidi Chen, Daoping Cai,\* Chaoqi Zhang and Hongbing Zhan\*



27409

## Data-mining fluoride-based solid-state electrolytes for monovalent metal batteries

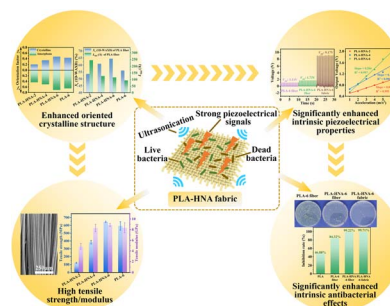
Gunyoung Heo, Aloysius Soon\* and Taehun Lee\*



27421

## Nucleator induced highly oriented crystalline structure of poly(lactic acid) fiber enables superior intrinsic piezoelectric and antibacterial effect

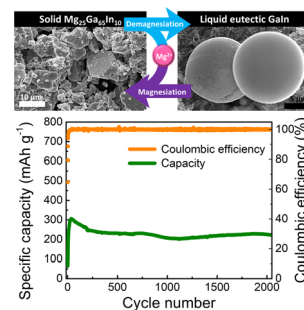
Wenjun He, Chenglong Yan, Xiaowen Zhao, Yuanchun Zhang\* and Lin Ye\*



27435

## Liquid eutectic gallium–indium as a magnesium-ion battery anode with ultralong cycle life enabled by liquid–solid phase transformation during (de) magnesiation at room temperature

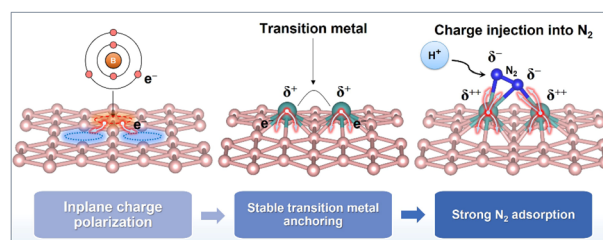
Lin Wang, Alexander Ng, Roxana Family, Eric Detsi\* and James Pikul\*



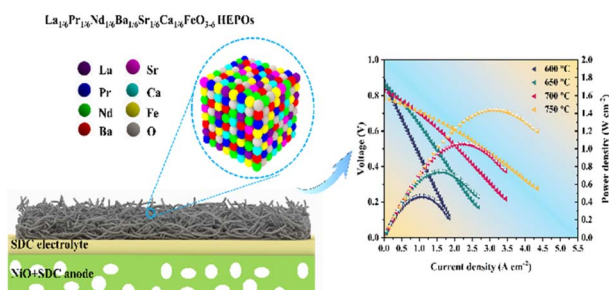
27443

## Controlled charge injection into nitrogen for efficient electrochemical nitrogen reduction based on metal-on-boron compound catalysts

Yunji Han, Mihyeon Jo, Hyung-Kyu Lim\* and Sangheon Lee\*



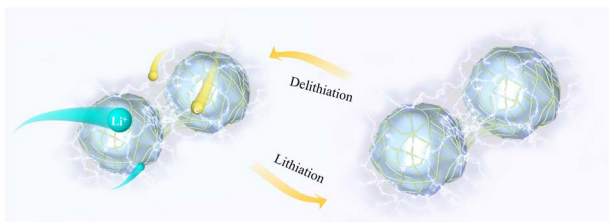
27452



### High-entropy cobalt-free perovskite as a high-performing nanofiber cathode for solid oxide fuel cells

Xinmin Fu, Shiquan Lü,\* Xiangwei Meng,\* Chuxiao Sun, Maobin Wei, Haipeng Jiang and Weijiang Gong\*

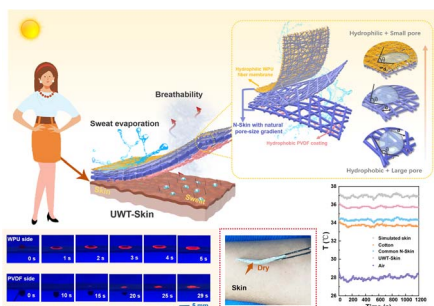
27464



### Resilient ion/electron dual conductive network with covalent/hydrogen bond cross-linking enables stable and high-energy-density Si–C anodes for lithium-ion batteries

Yupeng Xiao, Tianle Li, Xiaoqian Hao, Tianjiao Zhu, Jingqi Zang, Yuqian Li and Wenju Wang\*

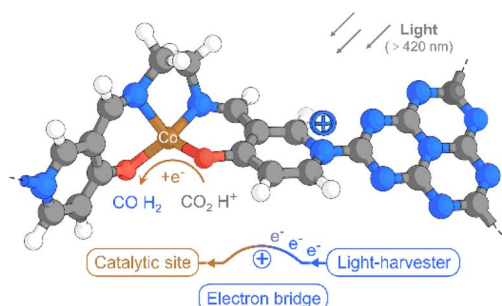
27478



### Design of a unidirectional water-transport skin-derived wearable material through engineering a natural pore-size gradient for personal wet-thermal management

Lu Gao, Yan Bao,\* Peng Lei, Sike Yu, Xiaofeng Zhu, Chao Liu, Wenbo Zhang\* and Jianzhong Ma\*

27491



### Constructing metallosalen poly(ionic liquid)s to boost photocatalytic CO<sub>2</sub> reduction

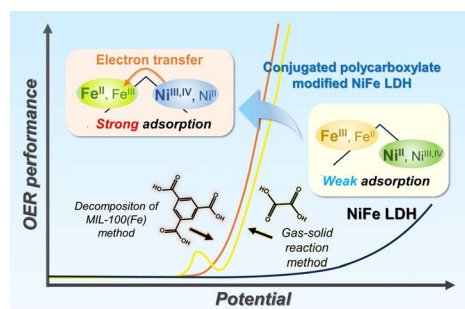
Xi Chen, Wei Zhou, Xu Fang, Cheng Li, Die Cong, Tie Yu, Wei-Qiao Deng and Chengcheng Liu\*



27497

## Conjugated polycarboxylate ligand-coordinated NiFe LDH for enhanced oxygen evolution

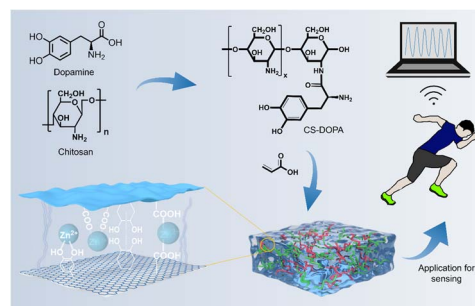
Zi-ye Liu, Qian-yu Wang, Teng Xu and Ji-ming Hu\*



27506

## A conductive hydrogel with excellent self-adhesion, sensitivity, and stability for wearable strain sensors to monitor human motion

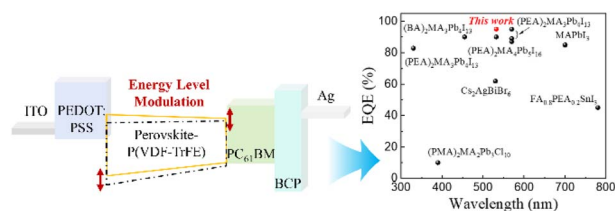
Huanxin Huo, Haoran Shi, Hongxing Yang, Xu Zhang, Jianyong Wan,\* Jingjie Shen,\* Guanben Du and Long Yang\*



27518

## A modulated heterojunction interface via ferroelectric P(VDF-TrFE) towards high performance quasi-2D perovskite self-powered photodetectors

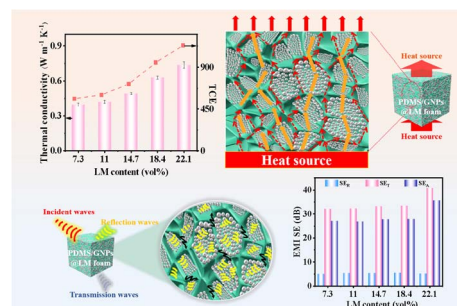
Yujian Du, Sijia Miao, Zhangsiyuan Jin, Yian Hu and Yuljae Cho\*



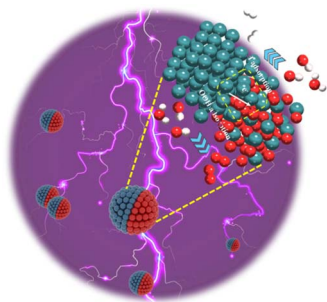
27527

## Dual network structures of PDMS-based composite foam via anchoring liquid metal nanoparticles for improved thermal conductivity and electromagnetic interference shielding performances

Ying Zhang, Song Yang, Yilin Liu, Ting Gu\* and Fei Liu\*



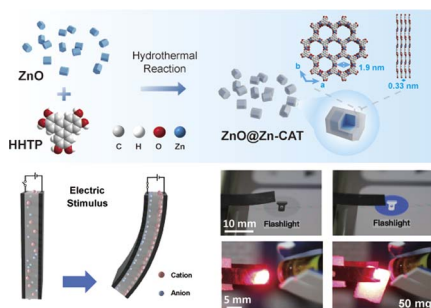
27540



### A one-step facile synthesis of fcc Ru–RuO<sub>2</sub> activates superior bifunctionality toward overall alkaline water splitting

Qianqian Fan, Yueyue Shao, Longzhou Zhang,\* Jia Zhou\* and Guigen Wang\*

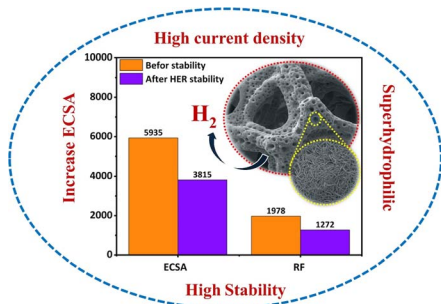
27549



### Novel two-dimensional conductive metal–organic framework-based heterostructures for high-performance electro-ionic soft actuators

Yingyi Wang, Shengzhao Li, Lin Liu, Simin Feng, Kejie Guan, Yixiang Shi, Fuqin Sun, Xiaowei Wang, Yaochun Shen, Cheng Zhang, Qianzuo Liu, Tie Li,\* Ting Zhang\* and Sujie Qin\*

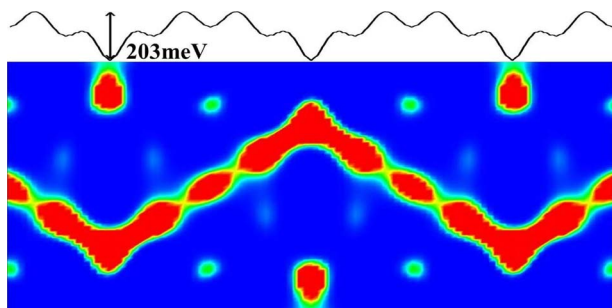
27558



### *In situ* electrochemical synthesis of superhydrophilic NiCoMn trimetallic-alloy nanosheets *via* the dynamic hydrogen bubble template method for developing high current density hydrogen production electrocatalysts

Shahab Paygozar, Alireza Sabour Rouhaghdam, Abdolvahab Seif and Ghasem Barati Darband\*

27570



### Revealing the lithium migration paths in Li<sub>4+x</sub>Ti<sub>5</sub>O<sub>12</sub> by neutron diffraction

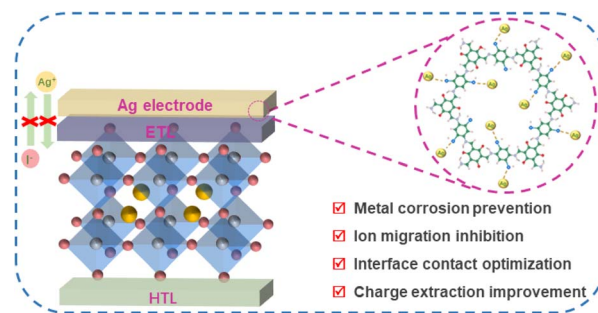
Hao Li,\* Yuanhua Xia, Wenwen Zeng, Haoran Zhan, Guangai Sun, Chaoqiang Huang, Jun Mei, Bojiang Lv, Yushuo Huang and Suyang Lu



27577

### Multi-functional interface modulation through thiol functionalized covalent organic frameworks for efficient and durable perovskite solar cells

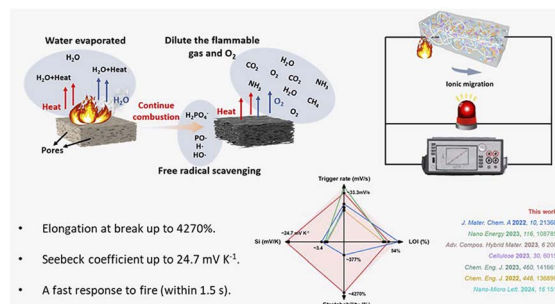
Bo Yu, Kai Wang, Yapeng Sun and Huangzhong Yu\*



27588

### Highly stretchable ionic hydrogels with enhanced thermoelectric performance and flame retardancy for intelligent fire protection

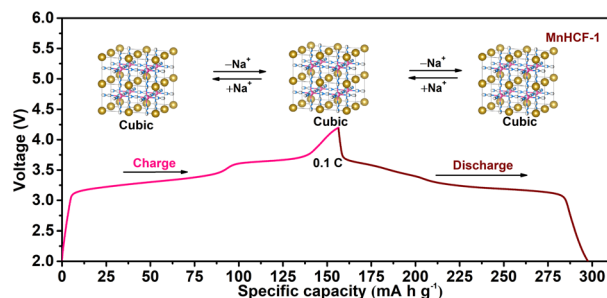
Mi Fu, Zhongzhong Wu, Xiaobo Liu, Yuwei Yuan, Xuejun Lai\* and Kan Yue\*



27598

### An ultra-stable Mn-based Prussian blue compound effectively suppresses Jahn–Teller distortion as a superior cathode material for sodium-ion batteries

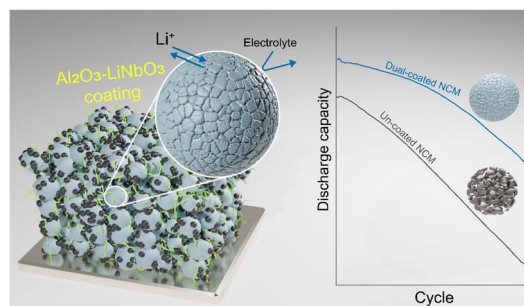
Xiangyu Ding, Qingbo Zhou, Ziyue Wang, Lei Liu, Yusong Wang, Tinglu Song, Feng Wu and Hongcai Gao\*



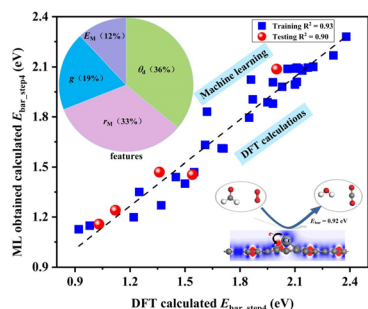
27610

### High structural stability and Li-conduction of LiNi<sub>0.8</sub>Co<sub>0.1</sub>Mn<sub>0.1</sub>O<sub>2</sub> cathode co-coated by Al<sub>2</sub>O<sub>3</sub> and LiNbO<sub>3</sub> for high performance lithium-ion battery

Chi Nguyen Thi Linh, Vu Dong Thuc, Duc Dung Mai, Minh Chien Nguyen, Mong Anh Le, Duy Tho Pham, Woo Jong Yu and Dukjoon Kim\*



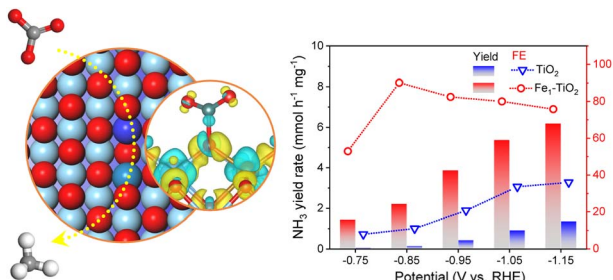
27623



### The catalytic oxidation of HCHO on metal single atoms supported by defective graphene: essential roles of the d electrons and radius of metal atoms

Quanguo Jiang,<sup>\*</sup> Jiawei Yang, Shihao Li, Huajie Huang and Zhimin Ao<sup>\*</sup>

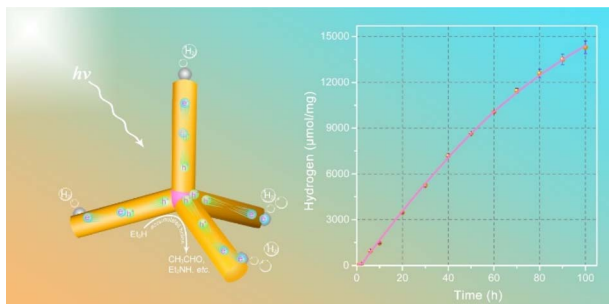
27632



### Asymmetric iron–titanium pairs within ultrathin TiO<sub>2</sub> nanosheets enable high-efficiency nitrate reduction to ammonia

Jiayi Wang, Peng Xia, Yang Lu, Mingyu Sheng, Fei Lu,<sup>\*</sup> Xi Wang<sup>\*</sup> and Min Zhou<sup>\*</sup>

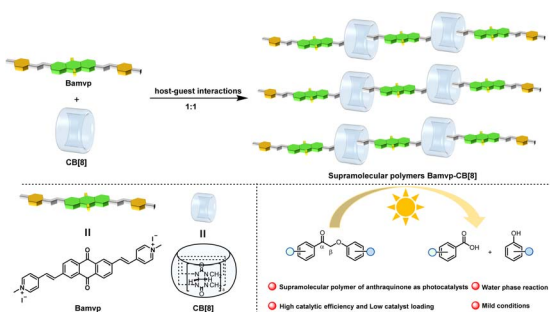
27641



### Accumulated photogenerated holes in type-II ZnSe/CdS nanotetrapods for efficient photocatalytic hydrogen evolution

Zhi-Kai Qin, Li-Lei Shen, Shuo Yan, Jingui Wang and Yu-Ji Gao<sup>\*</sup>

27652



### Construction of supramolecular linear polymers based on pyridinium modified anthraquinone and cucurbit[8]uril for visible-light-induced valorization of lignin models

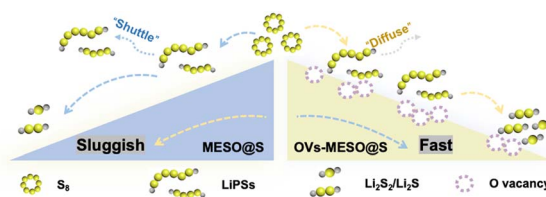
Fa-Dong Wang, Xian-Ya Yao, Xin-Long Li, Kai-Kai Niu,<sup>\*</sup> Shengsheng Yu, Hui Liu and Ling-Bao Xing<sup>\*</sup>



27660

## Harnessing medium entropy and oxygen defects in spinel ferrite cathodes for enhanced cycling performance in lithium–sulfur batteries

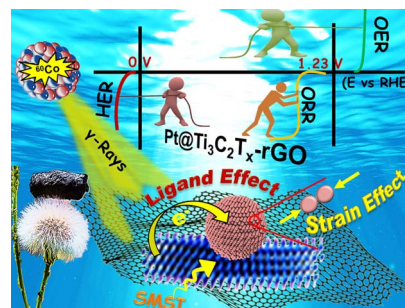
Jing Zhang, Jin Chen,\* Jian Wei,\* Yanyi Liu, Yuzhao Ma, Xiaofeng Yang and Yanjun Li



27671

## A nanoarchitected 2D–2D heterointerface of Pt@Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub>–rGO aerogels via *in situ* $\gamma$ -radiolysis induced self-assembly: interplay between strain and ligand effects in electrocatalytic interfaces

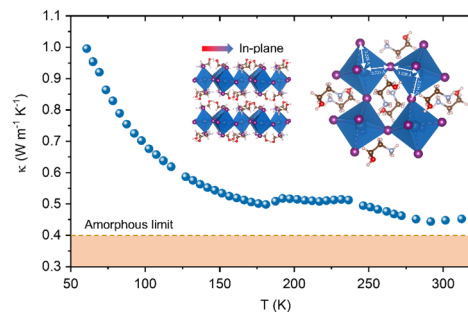
Linsha Vazhayal, Sharon Benny Alex and Santosh K. Haram\*



27686

## Unveiling the ultralow in-plane thermal conductivity in 2D organic–inorganic hybrid perovskite (EA)<sub>2</sub>PbI<sub>4</sub> single crystals

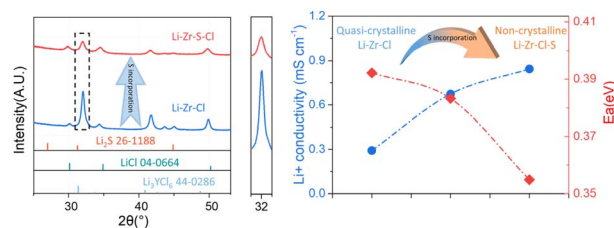
Pai-Chun Wei,\* Nashim Aktar, Jia-Kai Hu, Cheng-Chieh Wu, Yung-Hsiang Tung, Chun-Chuen Yang and Andrea Giugni



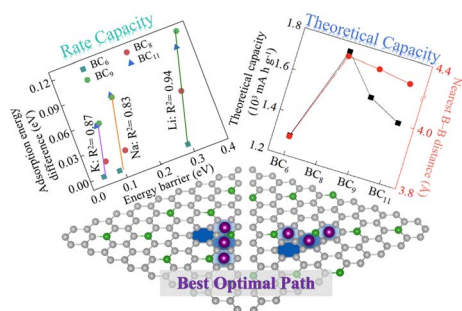
27694

## Amorphization of halide solid electrolytes for lithium super-ionic conductivity

Deli Xu, Jianshu He, Yuanyuan He, Sheng Wang, Guoxian Wu, Minghua Li, Hao Cheng, Kangzhe Yu,\* Xiao Huang\* and Bingbing Tian\*



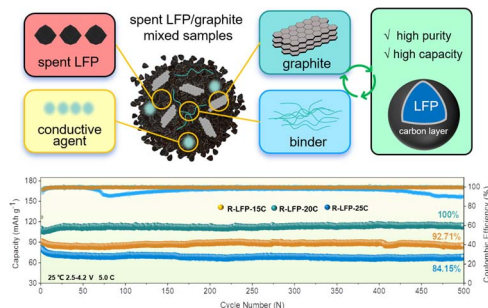
27703



## Revealing the key factors affecting the anode performance of metal-ion batteries: a case study of boron carbide monolayers

Shicong Ding, Xu Yan, Javed Rehman,\* Sheng Wang, Yong Liu and Guochun Yang\*

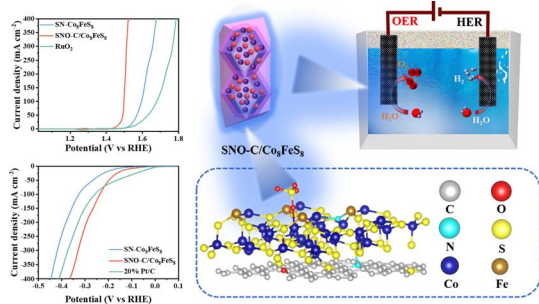
27712



## Purification–lithiation collaborative regeneration of mixed graphite/LiFePO<sub>4</sub>: building 2D Li<sup>+</sup>-diffusion channels towards enhanced energy-storage capabilities

Zihao Zeng, Xiangjin Lu, Shuya Lei, Hai Lei, Aigang Zhen, Yuanlong Liu, Xiaobo Ji, Wei Sun, Yue Yang and Peng Ge\*

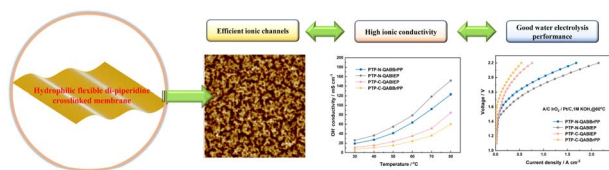
27724



## Multiscale regulation of S, N, O tri-doped carbon/Co<sub>9</sub>FeS<sub>8</sub> catalysts with SO<sub>4</sub><sup>2-</sup>-riched and lattice distortion for efficient water splitting

Yuanrong Ye, Xin Zhao,\* Guijuan Wei,\* Shaonan Gu, Changwei Li, Huixin Zhang, Junliu Zhang, Xiaoyang Li and Honglei Chen\*

27732



## Hydrophilic flexible di-piperidine crosslinked membranes with highly effective ionic channels for water electrolysis

Wenli Ma, Jianming Bai, Qingzhi Zhang, Lin Tian, Fanghui Wang and Hong Zhu\*



