

# Journal of Materials Chemistry A

Materials for energy and sustainability

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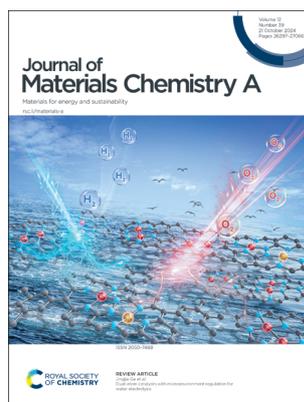
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## IN THIS ISSUE

ISSN 2050-7488 CODEN JMCAET 12(39) 26297–27066 (2024)



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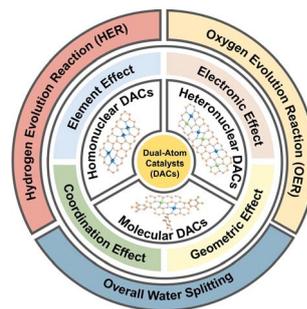
**Inside cover**  
See Jingjie Ge *et al.*, pp. 26316–26349. Image reproduced by permission of Jingjie Ge from *J. Mater. Chem. A*, 2024, 12, 26316.

## REVIEWS

26316

### Dual-atom catalysts with microenvironment regulation for water electrolysis

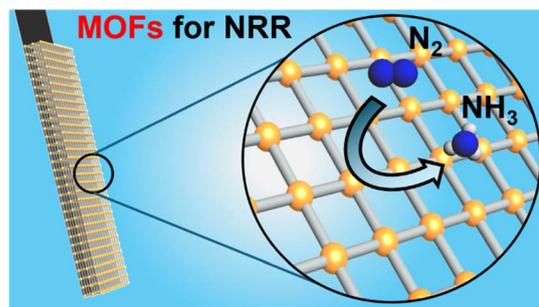
Ruoqing Xu, Rongbo Sun, Hai-Qun Xu, Gang Xie and Jingjie Ge\*



26350

### Metal–organic frameworks as promising electrocatalysts for the nitrogen reduction reaction: mapping the research landscape and identifying future trends

Riki Nakatani, Saikat Das\* and Yuichi Negishi\*



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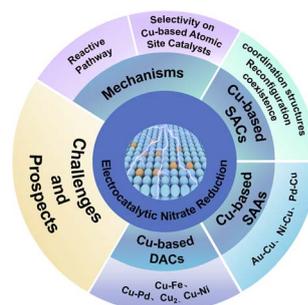
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## REVIEWS

26367

### When electrocatalytic nitrate reduction meets copper-based atomic site catalysts

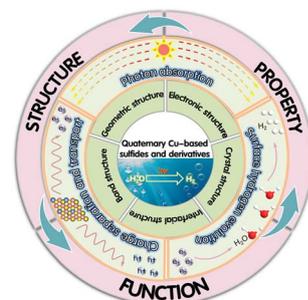
Xiaoqian Liu, Tianyi Xiang, Yuntao Liang, Xiangqin Zhou, Zihao Wang, Jianbin Liu, Min Cheng, Chengyun Zhou\* and Yang Yang\*



26390

### Recent advances in quaternary copper-based sulfides and their derivatives for solar hydrogen evolution

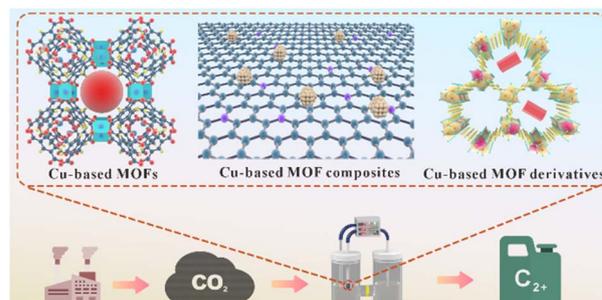
Yu Li, Zheming Liu, Jie Chen, Shuaibing Wang, Ouyang Lin, Chunhe Yang, Zhe Yin\* and Aiwei Tang\*



26421

### Cu MOF-based electrocatalysts for CO<sub>2</sub> reduction to multi-carbon products

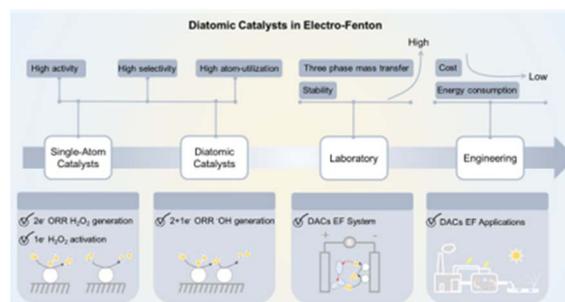
Li-Xia Liu,\* Chengyu Qin, Taojiang Deng, Liming Sun, Zifan Chen and Xiguang Han\*



26439

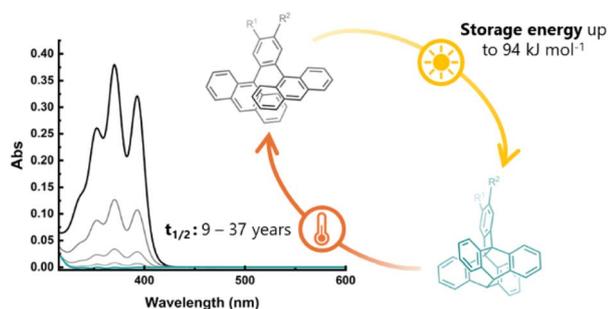
### Engineered diatomic catalyst empowered electro-Fenton processes for advanced water purification

Wenxin Sun, Hua Zou, Guoshuai Liu,\* Xiaohong Guan, Shaobin Wang and Xiaoguang Duan\*



## COMMUNICATIONS

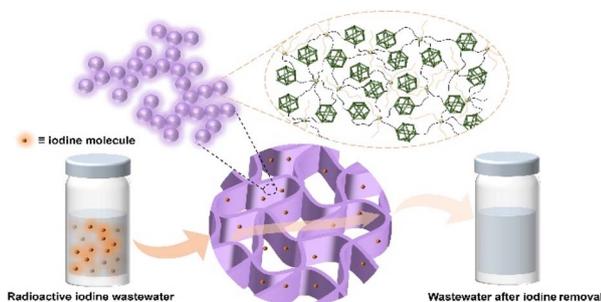
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### Exploring *ortho*-dianthrylbenzenes for molecular solar thermal energy storage

Nicolò Baggi, Lidiya M. Muhammad, Zacharias Liasi, Jacob Lynge Elholm, Paulius Baronas, Elies Molins, Kurt V. Mikkelsen and Kasper Moth-Poulsen\*

26465

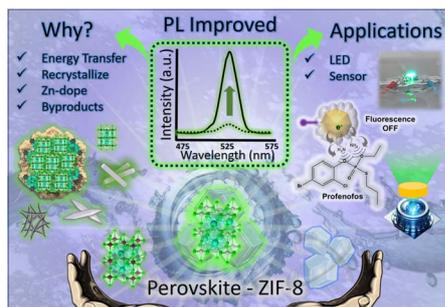


### Robust hydrogels with hierarchical porosities from the controlled assembly of metal–organic polyhedra for rapid removal of low-concentration aqueous iodine

Haiyan Xiao, Jia-Fu Yin, Hanqiu Jiang, Linjie Lan, Jiadong Chen, Wei Liu-Fu, Shengqiu Liu, Yubin Ke and Panchao Yin\*

## PAPERS

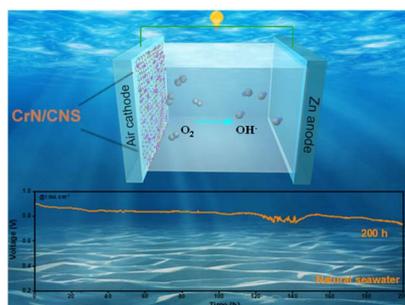
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### Investigating a simple and sustainable photoluminescence improvement approach for a highly applicable perovskite-ZIF-8 hybrid material by using water

Andi Magattang Gafur Muchlis and Chun Che Lin\*

26484



### Carbon nanosheet-supported CrN nanoparticles as efficient and robust oxygen reduction electrocatalysts in acidic media and seawater Zn–air batteries

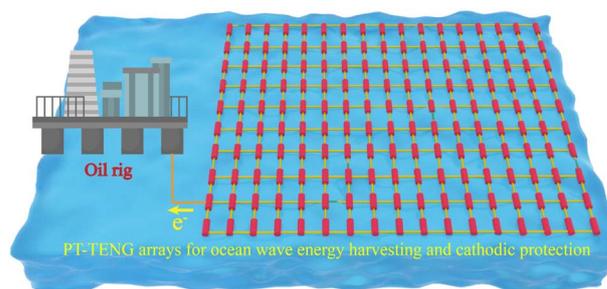
Yating Zhang, Haoming Wu, Jun Ma, Junming Luo,\* Zhe Lu, Suyang Feng, Yijie Deng,\* Hui Chen, Qi Wang, Zhengpei Miao, Peng Rao, Neng Yu, Yuliang Yuan, Jing Li and Xinlong Tian\*



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### A high-output tubular triboelectric nanogenerator for wave energy collection and its application in self-powered anti-corrosion applications

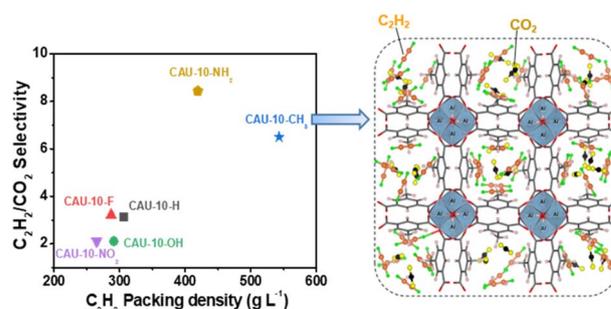
Wentao Li, Yupeng Liu, Weixiang Sun, Hanchao Wang, Wengqi Wang, Jie Meng, Xiaoqing Wu, Chuanpeng Hu, Daoai Wang\* and Ying Liu\*



26502

### Functional group tuning of CAU-10(Al) for efficient C<sub>2</sub>H<sub>2</sub> storage and C<sub>2</sub>H<sub>2</sub>/CO<sub>2</sub> separation

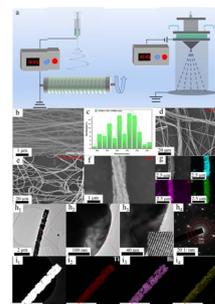
Eun Woo Lee, Balkaran Singh Sran, Ayoub Daouli, Maftun Salimov, Ji Woong Yoon, Kyung Ho Cho, Donghui Jo, Guillaume Maurin,\* Su-Kyung Lee\* and U-Hwang Lee\*



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### Synergistic effect of the PMIA nanofiber membrane with a dual-oriented network structure and Li<sub>0.5</sub>Bi<sub>0.5</sub>TiO<sub>3</sub> nanofibers for high-performance lithium metal batteries

Zhaozhao Peng, Nanping Deng,\* Xiaofan Feng, Junbao Kang, Shuaishuai Wang, Tinglu Zheng, Bowen Cheng and Weimin Kang\*



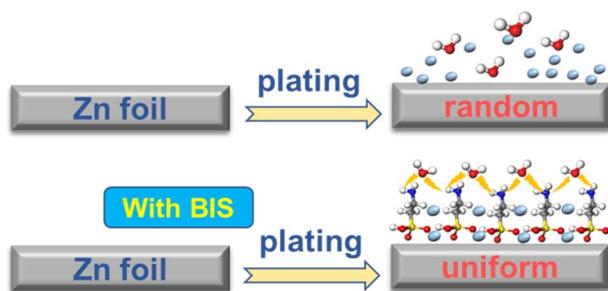
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### Hierarchical core-shell heterostructure FeMoS<sub>4</sub>@CoFe LDH for multifunctional green applications boosting large current density water splitting

Chun Han, Yunhe Zhao,\* Gong Chen, Haiyan Song, Xiaoliang Wu, Zehua Guo and Chunxia Chen\*



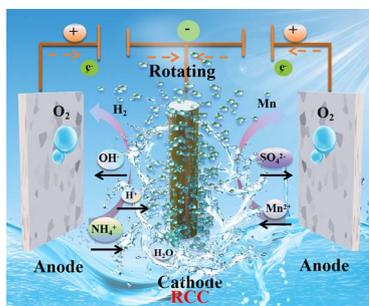
26536



### Bifunctional interface stabilizer for promoting preferential crystal face adsorption and inducing planar Zn growth

Tiancun Liu,\* Song Lu, Ronghan Jiang, Ling Chen, Xusheng Wang, Yong Wang\* and Zhixin Yu

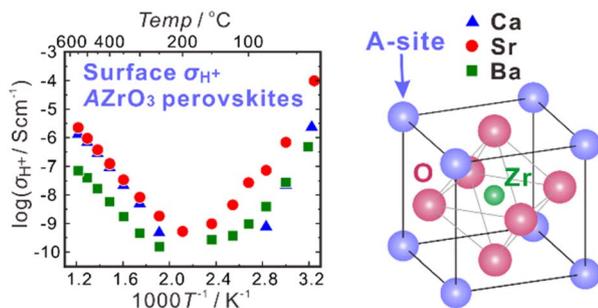
26544



### Revealing the mass transfer of proton donors for tailoring hydrogen evolution coupled with manganese electrodeposition

Cai Tan, Chaoyi Chen,\* Fan Yang,\* Junqi Li, Liangxing Jiang, Changping Shi, Jianguan Yang, Yuanyu Chen and Lu Yu

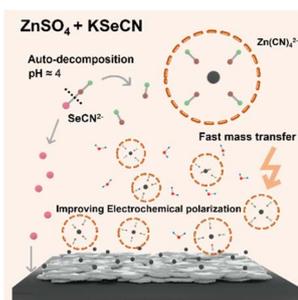
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### Surface protonic conduction in porous alkaline earth zirconate perovskites $\text{CaZrO}_3$ , $\text{SrZrO}_3$ , and $\text{BaZrO}_3$

Jie Gu, Xinwei Sun, Lulu Jiang, Zihan Zhang, Truls Norby\* and Donglin Han\*

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### Mediation of the electrochemical polarization for durable zinc anode

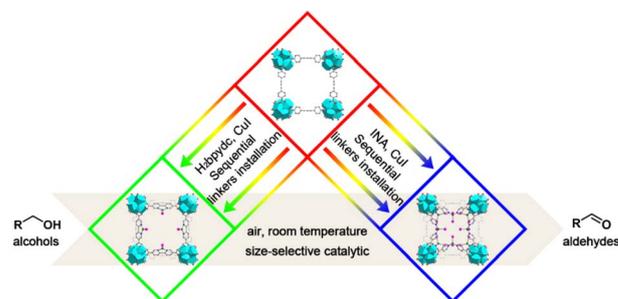
Ruixuan Yang, Yuchen Jiang, Simin Dai, Bei Qi, Yan Wang, Xinyan Zhuang, Haoying Han, Renfei Wei, Kefeng Xie, Rong Yang\* and Liang Huang\*



26578

## Structural and catalytic regulation in a rigid Zr-MOF through linker installation

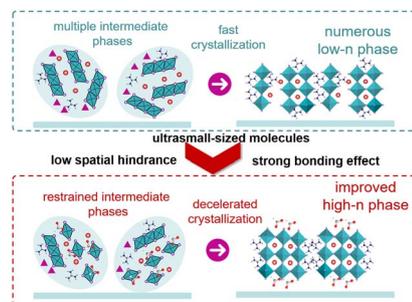
Jinyi Huang, Fugang Li, Yuxuan Meng, Xi Lin, Suijun Liu, Liangliang Zhang\* and Yu Fang\*



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## Restraining unfavorable phases *via* reduced spatial hindrance of ultra small-sized molecules to enable high-performance quasi-two-dimensional perovskite solar cells

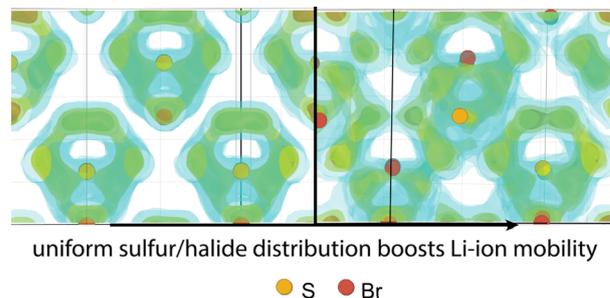
Dengxue Li, Shiyu Rao, Biao Hu, Canqiang Du, Jiajie Hong, Xiaotian Hu, Yiwang Chen and Ting Hu\*



26596

## Optimizing ionic transport in argyrodites: a unified view on the role of sulfur/halide distribution and local environments

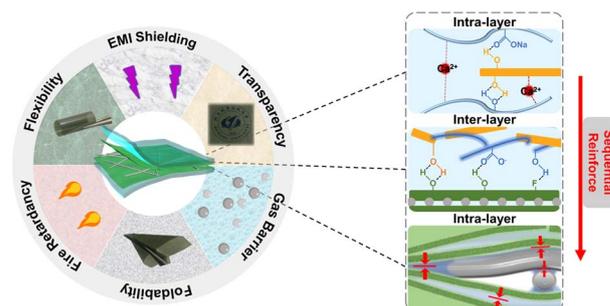
Anastasia K. Lavrinenko, Theodosios Famprikis, James A. Quirk, Victor Landgraf, Pedro B. Groszewicz, Jouke R. Heringa, Stef Smeets, Victor Azizi, Simone Ciarella, James A. Dawson, Marnix Wagemaker\* and Alexandros Vasileiadis\*



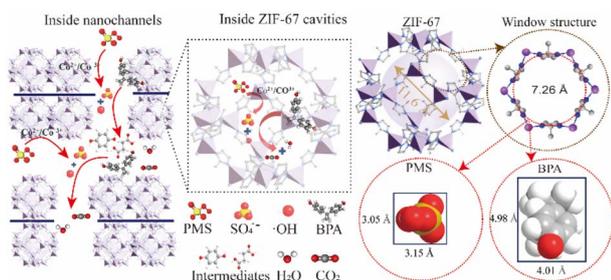
26612

## Sequential reinforcement of intra/interlayer interfaces to design flexible, transparent electromagnetic interference shielding film for "Green Electronics"

Gao Deng, Xin Sun, Xufeng Li, Zhenyang Li, Haihan Zou, Peng Yi, Ming Fang, Chunyan Chen, Junzhe He, Jianglan Shui, Ronghai Yu\* and Xiaofang Liu\*



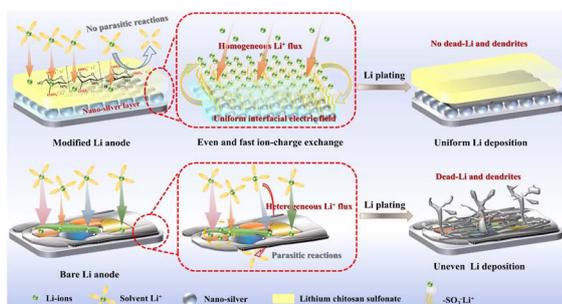
26627



### Ultrafast degradation of organic pollutants enabled by nanofluidic ZIF-67/GO membranes via efficient nanoconfined peroxymonosulfate activation

Jian Hu, Jue Hou, Chen Zhao, Yuyu Su, Rong Wang and Huacheng Zhang\*

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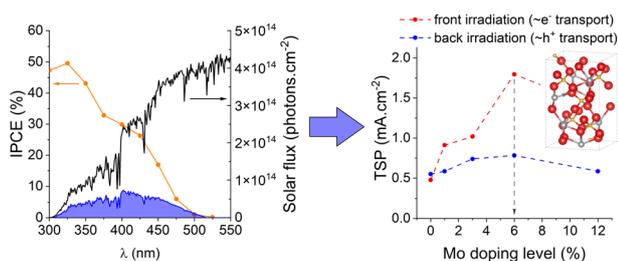


### Synergistic dual-interface engineering with self-organizing Li-ion/electric fields for enhanced lithium metal anode stability

Zhiqiang Li,\* Kemeng Liao, Lihong Yin, Zongrun Li, Yingzhi Li, Hongzhi Wang, Ning Qin, Shuai Gu, Jingjing Chen, Weihua Wan\* and Zhouguang Lu\*

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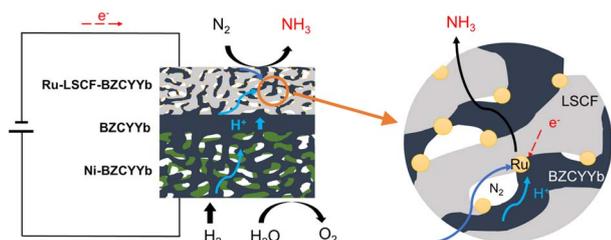
### Series of Mo-doped BiVO<sub>4</sub> grown by CVD



### The aerosol-assisted chemical vapour deposition of Mo-doped BiVO<sub>4</sub> photoanodes for solar water splitting: an experimental and computational study

Shaobin Zhao, Chenglin Jia, Xinyi Shen, Ruohao Li, Louise Oldham, Benjamin Moss, Brian Tam, Sebastian Pike, Nicholas Harrison, Ehsan Ahmad\* and Andreas Kafizas\*

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### A mixed proton–electron–conducting cathode with a Ru nanoparticle catalyst for electrochemical ammonia synthesis based on a proton-conducting BZCYyb electrolyte

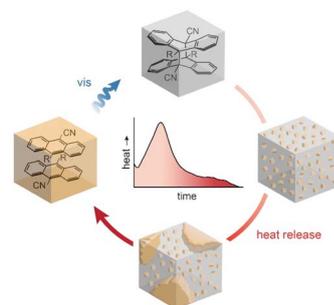
Jiaqi Chen, Wenbo Gao,\* Liangzhu Zhu, Haoliang Tao, Sheng Feng, Hujun Cao, Jianping Guo, Yanxia Chen\* and Ping Chen



26678

### Elucidating the mechanism of solid-state energy release from dianthracenes *via* auto-catalyzed cycloreversion

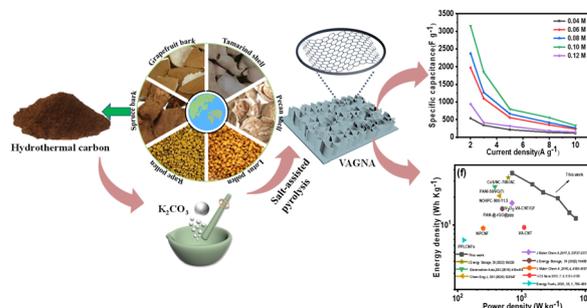
Cijil Raju, Zhenhuan Sun, Ryo Koibuchi, Ji Yong Choi, Subhayan Chakraborty, Jihye Park, Hirohiko Houjou,\* Klaus Schmidt-Rohr\* and Grace G. D. Han\*



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### Gram-scale production of vertically aligned holey graphene nanosheet arrays derived from a renewable biomass precursor *via* a facile hydrothermal/salt-assisted pyrolysis method for aqueous high-performance redox supercapacitors

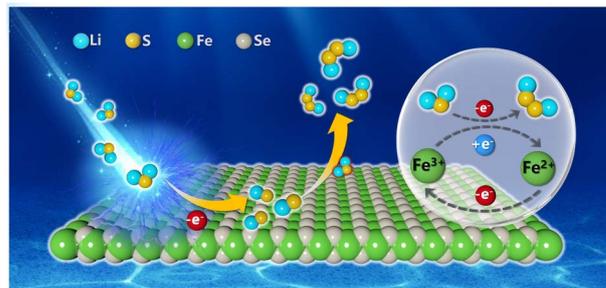
Qincheng Yang, Shuaibing Liu, Qianglin Li,\* Ling Wu,\* Binghua Zhou, Zhipeng Wang, Zheng-Hong Huang, Hao Yang and Ming-Xi Wang\*



26707

### Enhancing sulfur oxidation reaction by overcoming redox barriers with FeSe<sub>2</sub>@C for lithium–sulfur batteries

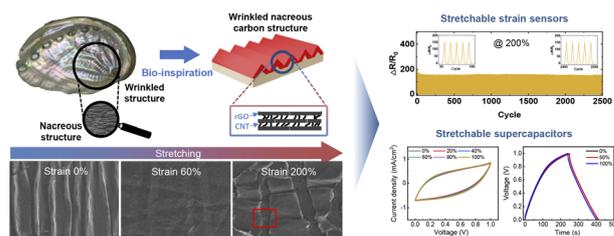
Pengkun Zou, Yushuang Lin, Long Li, Jiixin Wang, Yu Chao, Borong Li, Hongyun Ma,\* Zheyuan Liu, Yan Yu\* and Chengkai Yang\*



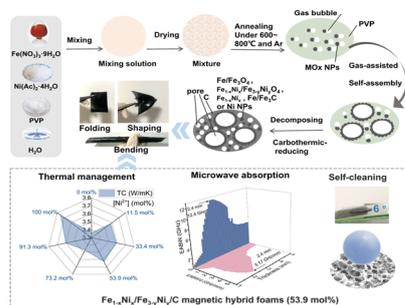
26718

### Multifunctional wrinkled nacreous all-carbon films for high-performance stretchable strain sensors and supercapacitors

Soo-Hyeon Cho, TaeGyeong Lim, Hyeon-Jong Lee, Sang-Yun Kim and Ji Won Suk\*



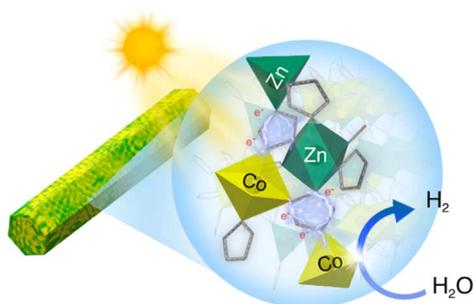
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### Excellent self-cleaning, ultrawideband absorption, and rapid heat dissipation of magnetic hybrid foams from a facile one-step annealing route

Yangbing Chen, Ran Ji, Xuan Chen, Peiwen Wang, Huiming Ye, Guoxiu Tong,\* Xiaojuan Wang and Wenhua Wu

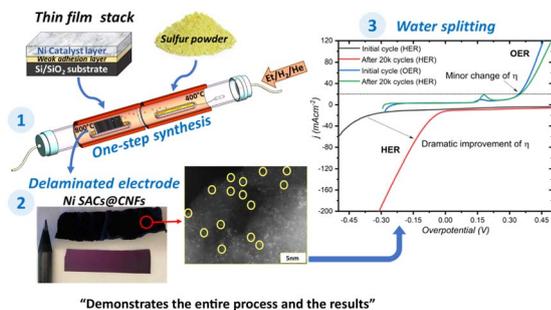
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### Self-shuttle-mediated electron transfer to boost photocatalytic hydrogen production of Co-Zn bimetallic MOF

Taya Ko Saothayanun, Yollada Inchongkol, Nopphon Weeranoppanant, Mio Kondo, Makoto Ogawa and Sareeya Bureekaew\*

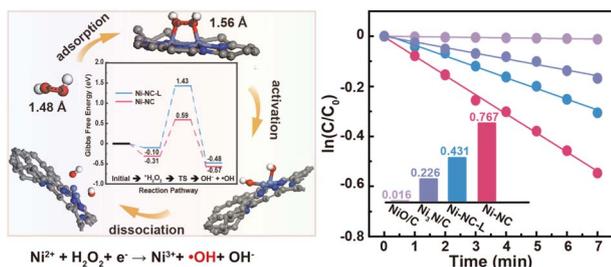
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### High performance, binder-free electrodes with single atom catalysts on doped nanocarbons for electrochemical water splitting synthesized using one-step thermally controlled delamination of thin films

Efrat Shawat Avraham, Bibhudatta Malik, Alina Yarmolenko, Rajashree Konar, Sergei Remennik, Gili Cohen Taguri, Sandro Zorzi, Elti Cattaruzza, Michael Yakov Hubner and Gilbert Daniel Nessim\*

26762



### High-density single-atomic Ni-N<sub>4</sub> sites for efficient Fenton-like reactions

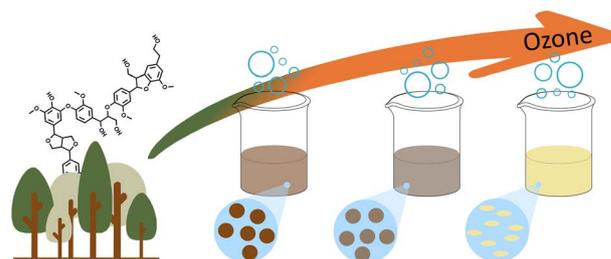
Shu-Qi Wang, Katherine Velez, Jiahui Cai, Linbo Huang, Qing-Hua Zhang, Feng Feng, Qi An,\* Lu Zhao\* and Jin-Song Hu



26772

## Ozonolysis of regular and crosslinked lignin nanoparticles: closing the loop

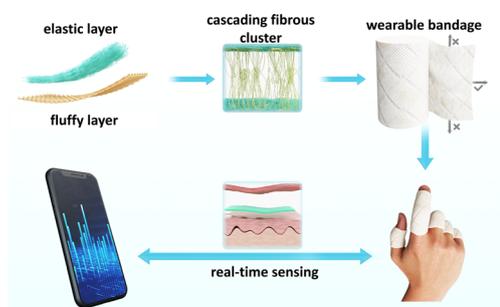
Alexandros E. Alexakis\* and Mika H. Sipponen\*



26780

## Design and large-scale preparation of a laminated elastic fabric with high softness and a cascading fibrous cluster structure for wearable smart bandages

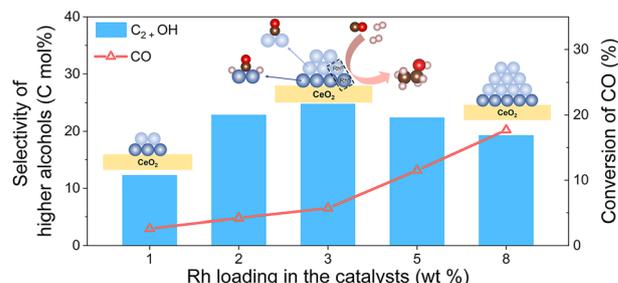
Heng Zhang,\* Ke Zhao, Qian Zhai, Xiaoyu Guan, Jingqiang Cui and Qi Zhen



26791

## Maximizing the number of Rh<sup>0</sup>–Rh<sup>+</sup> sites through metal dispersion control for the synthesis of higher alcohols from syngas

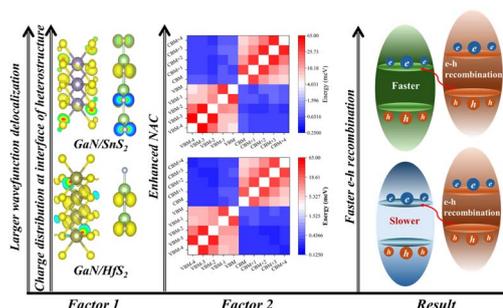
Ruyang Wang, Heng Cao, Peiyu Ma and Jun Bao\*



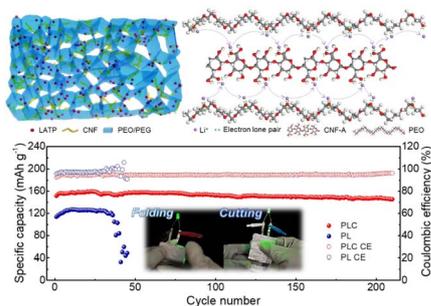
26800

## Unveiling ultrafast carrier dynamics in photocatalytic 2-D heterostructures: insights from first-principles and nonadiabatic molecular dynamics

Zelong Gong, Zhao Qian,\* Jian Gao, Kaixin Yang, Shiyu Cao, Muhammad Sajjad, Yuanning Jiang, Jianqiang Bi and Rajeev Ahuja



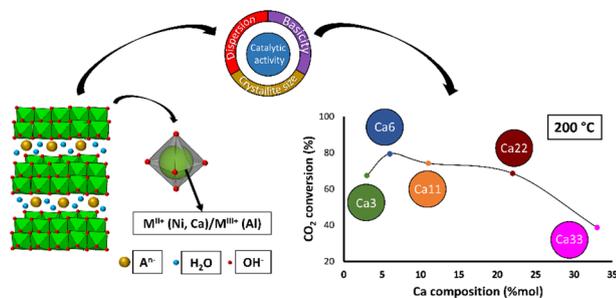
26809



### High ionic conductivity of a flexible solid-state composite electrolyte for a lithium-ion battery

Yu-Huei Song, Yu-Ching Chen, En-Ci Lin, Tzu Yun Liang, Che Ya Wu, Ai-Yin Wang, Han-Yi Chen and Jyh Ming Wu\*

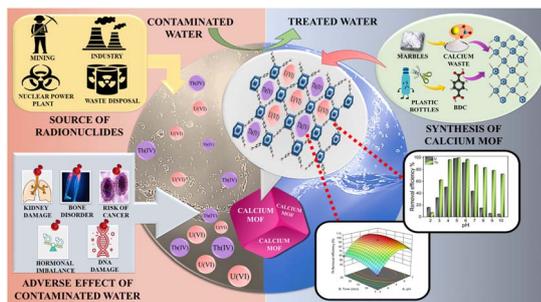
26820



### Tuning the Ca content of Ni–Ca–Al layered-double hydroxide catalysts for low-temperature CO<sub>2</sub> methanation

Yan Resing Dias and Oscar W. Perez-Lopez\*

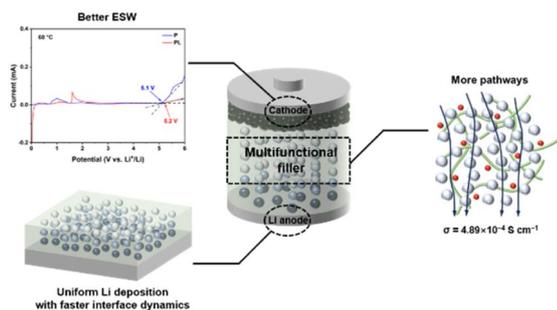
26833



### Harnessing waste PET bottles for sustainable Ca-MOF synthesis: a high-efficiency adsorbent for uranium and thorium

Manish Sharma, Anshika, Priya Sharma, Vikash Chandra Janu and Ragini Gupta\*

26848



### Utilizing Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> as multifunctional filler in composite solid electrolyte for all-solid-state lithium metal battery

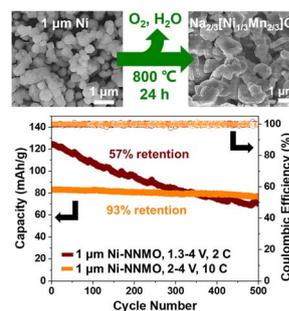
Yubo Xu, Xiaosong Xiong, Jun Peng, Qi Zhou, Wenzhuo Wu, Wanjie Gao, Yi Peng, Tao Wang,\* Faxing Wang and Yuping Wu\*



26857

## Environmentally responsible synthesis of high-performance P2-Na<sub>2/3</sub>[Ni<sub>1/3</sub>Mn<sub>2/3</sub>]O<sub>2</sub> sodium-ion battery cathodes

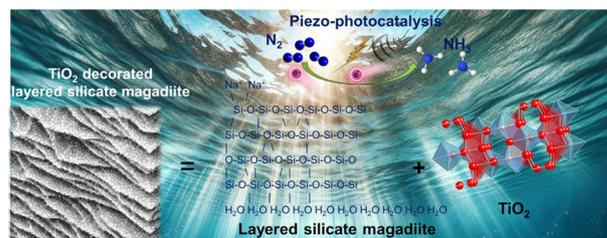
Jintao Fu, Mohamed H. Hassan, Jiaxin Liu, Hyeongjun Koh, Alexander K. Ng, Chiara Bruzzi, John S. Corsi and Eric Detsi\*



26866

## Enhanced ammonia production via synergistic piezo-photocatalysis using TiO<sub>2</sub>@layered silicate magadiite nanosheets

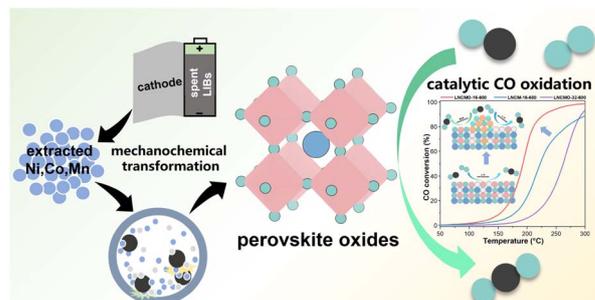
Ke-Chun Ma, Hsun-Yen Lin, Yu-Ching Chen, Cheng-Hsi Tsai, Kai-Han Zheng and Jyh Ming Wu\*



26877

## Mechanochemical transformation of spent ternary lithium-ion battery electrode material to perovskite oxides for catalytic CO oxidation

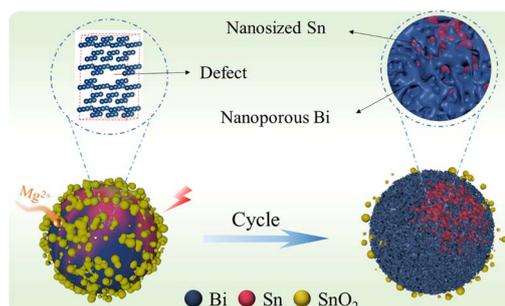
Guangze Nie, Xiangqian Du, Hongchao Yu, Weiya Fan, Min Pan, Fei Gao, Feng Wu, Yunchuan Hong, Hongjian Tang, Zhihao Zhou, Guoshu Deng, Lin Li, Zhenkun Sun\* and Lunbo Duan\*



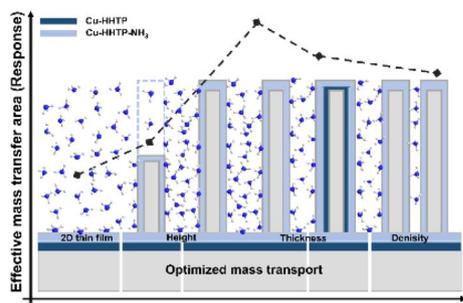
26890

## Realizing high-stability anodes for rechargeable magnesium batteries via *in situ*-formed nanoporous Bi and nanosized Sn

Dachong Gu, Yuan Yuan,\* Xianhao Peng, Dajian Li, Liang Wu, Guangsheng Huang, Jingfeng Wang and Fusheng Pan



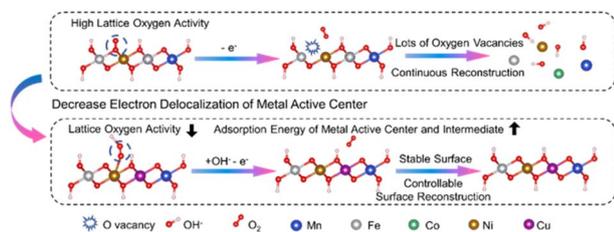
26902



### Mass transport control over a conductive MOF 3D thin film to improve gas sensing

Yu Pan, Wei Sun, Junxiang Chen, Yuan Lin, Yong-Jun Chen,\* Zhenhai Wen\* and Gang Xu\*

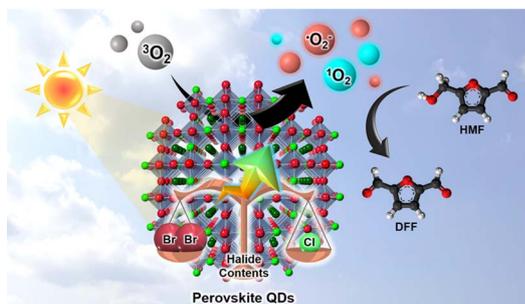
26909



### Restricting the over-oxidation of active sites in high-entropy electrocatalysts towards ultra-stabilized oxygen evolution in alkaline water electrolysis

Yimin Zhang, Jianli Kang,\* Haonan Xie, Hongxia Yin, Zhijia Zhang, Yuhan Ma, Guangxin Sun, Enzuo Liu, Liying Ma, Biao Chen, Junwei Sha, Lihua Qian, Wenbin Hu, Chunnian He and Naiqin Zhao\*

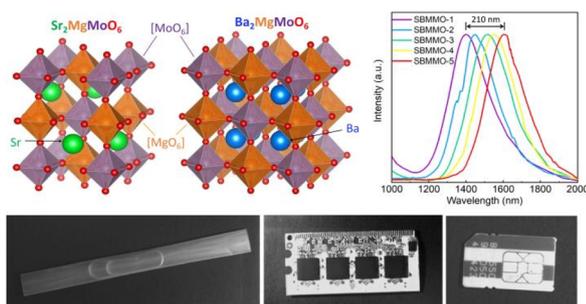
26920



### Photocatalytic conversion of 5-hydroxymethylfurfural using mixed halide perovskite MAPbBr<sub>x</sub>Cl<sub>3-x</sub> quantum dots

Jaemin Han, Hangil Lee\* and Hyun Sung Kim\*

26929



### Long-wavelength near-infrared light emitting Ni<sup>2+</sup>-doped double perovskite molybdate-based solid-solution phosphors

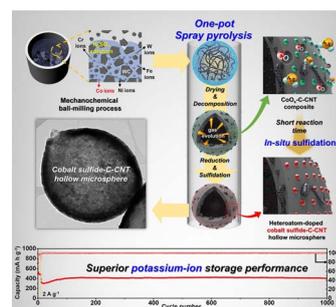
Fengmei Zhu, Yuan Gao\* and Jianbei Qiu\*



26939

### One-pot spray pyrolysis method for nanostructured cobalt sulfide–C composite microspheres using recovered cobalt sulfuric acid solution and their excellent properties as anode materials for potassium-ion batteries

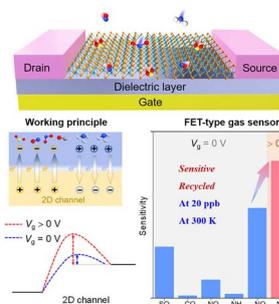
Yeong Beom Kim, A Yeon Jo, Seulgi Kim, Seungjo Jeong, Yun Chan Kang,\* Dongju Lee\* and Gi Dae Park\*



26951

### An ultra-sensitive and recyclable FET-type toxic gas sensor based on WTe<sub>2</sub> monolayers

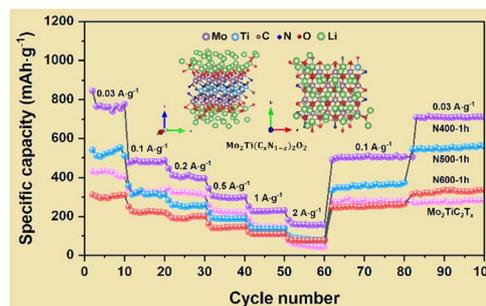
Mi-Mi Dong, Hang He, Ming-Wen Zhao,\* Chuan-Kui Wang\* and Xiao-Xiao Fu\*



26962

### Achieving high electrical conductivity, energy storage capacity and cycling stability in ammoniated Mo<sub>2</sub>TiC<sub>2</sub>T<sub>x</sub> MXenes as an anode for lithium-ion batteries

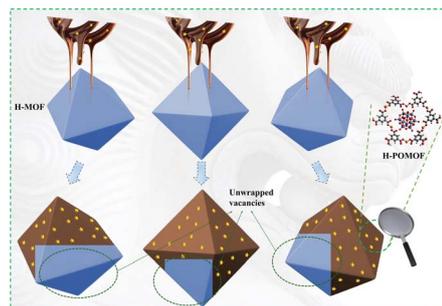
Jingya Liu, Xin Xu, Hongkang Wang, Peng-Fei Wang, Kai Wu, Yonghong Cheng\* and Bing Xiao\*



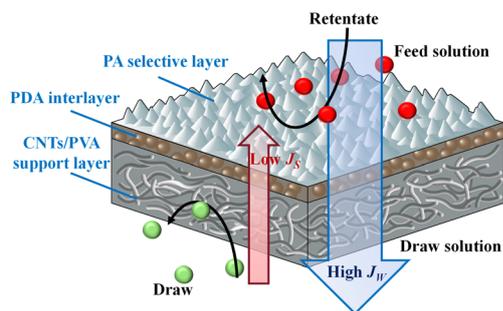
26980

### Characterization, oxidative desulfurization performance evaluation and the catalytic reaction mechanism of polyoxometalate-coated, semi-encapsulated heart-shaped metal organic frameworks

Zhengxiang Sun and Rui Wang\*



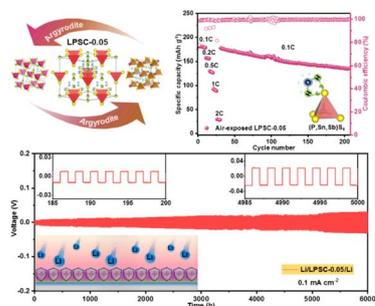
26999



## An ultrathin support layer based on carbon nanotubes/polyvinyl alcohol for forward osmosis membranes with outstanding water flux

Hsi-Yuan Juan, Shivam Gupta, Chi-Young Lee, Yi-Ting Lai\* and Nyan-Hwa Tai\*

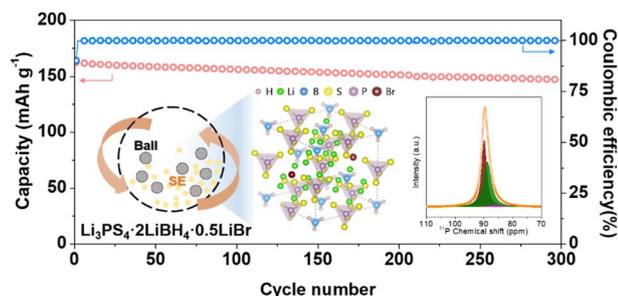
27011



## High performance P-based argyrodite sulfide electrolytes enabled by Sb-based argyrodite doping for all-solid-state lithium metal batteries

Zhihui Ma, Ping Li,\* Jie Shi, Feng Sun, Yidi Fu, Zhen Wang, Yixing Fang, Junmei Han and Xuanhui Qu

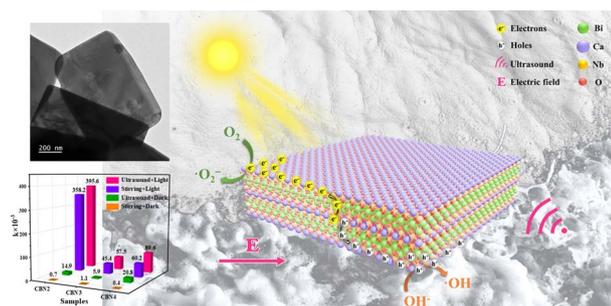
27022



## Enhancement of ionic conductivity in Li argyrodite solid electrolytes with bromide and borohydride anions for all-solid-state batteries

Hyungeun Seo, Yong-Jin Jang, Jaeseong Yoo, Ji-Hoon Han, Young-Su Lee, Jae Yup Jung, Soeun Lee, Kyung-Woo Yi, Young Whan Cho, Woosuk Cho\* and Jae-Hun Kim\*

27031



## Ultra-high piezo-photocatalytic performance of (Na, Sm) co-doped $\text{CaBi}_2\text{Nb}_2\text{O}_9$ nanoplates by the surface effect

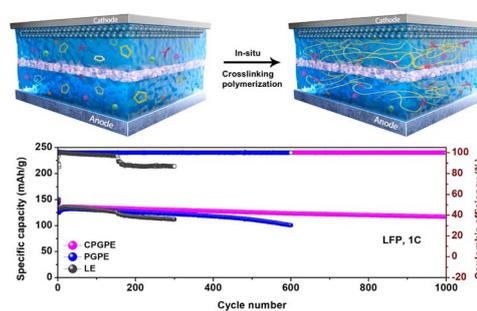
Qiuyan Yi, Xiaogang Luo, Xuefan Zhou, Yan Zhao, Qiong Liu, Qiwei Sun, Hang Luo\* and Dou Zhang\*



27043

## Synthesis of a crosslinked ether-based polymer for high-performance semi-solid lithium metal batteries *via in situ* integration

Dezhi Yang, Yanan Yang, Yeying Cui, Yiyang Sun and Tao Zhang\*



27053

## Low-temperature ionothermal polymerization of phenazine-based small molecules towards ultrastable and high-capacity anodes of aqueous alkaline sodium-ion batteries

Xiaorong Yan, Mingjun Hu,\* Guoqing Zhao, Chuanguang Wu, Rui Li, Xinyu Wang, Haiping Yu, Zhihui Wang, Bei Wang, Yuxin Hao, Jingru Liu, Yilan Wu\* and Jun Yang\*

