

# Journal of Materials Chemistry A

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## IN THIS ISSUE

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**Cover**  
See Yuanyuan Liu, Yuqiao Wang *et al.*, pp. 19891–19898. Image reproduced by permission of Yuqiao Wang from *J. Mater. Chem. A*, 2024, 12, 19891.



**Inside cover**  
See Xiao Luo *et al.*, pp. 19899–19909. Image reproduced by permission of Qi Nie, Wenqing Li, Kuilin Li and Xiao Luo from *J. Mater. Chem. A*, 2024, 12, 19899.

## EDITORIAL

19604

### Design and characterization of flexible electrode materials

Xiu Song (George) Zhao,\* Hui Ying Yang\* and Qiang Li\*

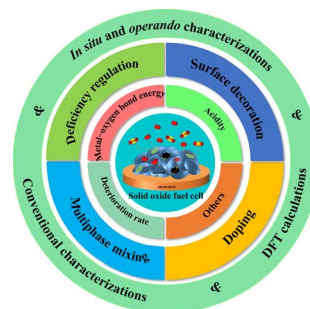


## REVIEWS

19606

### CO<sub>2</sub>-tolerant perovskite cathodes for enhanced solid oxide fuel cells: advancements, challenges, and strategic perspectives

Zilin Ma, Qirui Ye, Huaqing Ye, Feifei Dong,\* Meng Ni\* and Zhan Lin



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Fundamental questions  
Elemental answers

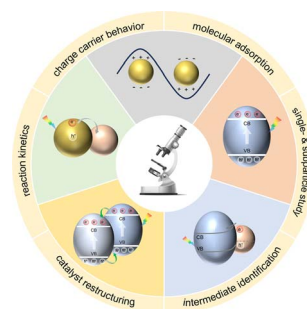


## REVIEWS

19627

## Single-molecule fluorescence imaging of photocatalytic nanomaterials

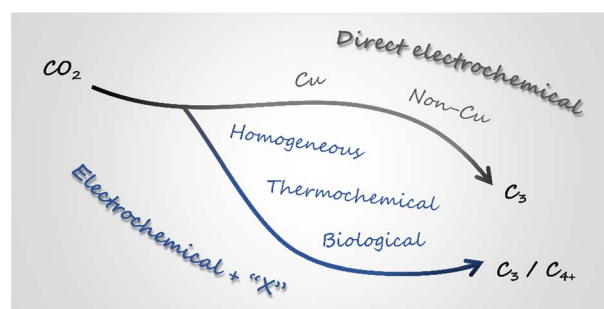
Shuchi Zhang, Deqi Fan, Qingdian Yan, Yi Lu, Donglei Wu, Bing Fu and Ming Zhao\*



19663

Recent advances in upgrading CO<sub>2</sub> to C<sub>3+</sub> products via electrochemical and complementary engineering

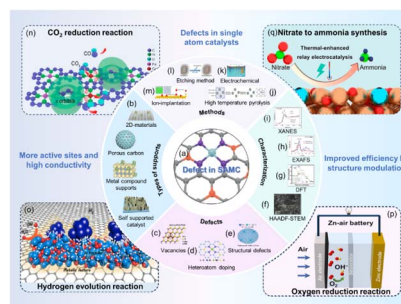
Xian Zhong, Hong-Jie Peng, Chuan Xia\* and Xinyan Liu\*



19685

## Tailoring single-metal atom catalysts: a strategic defect engineering approach for electrochemical reduction reactions

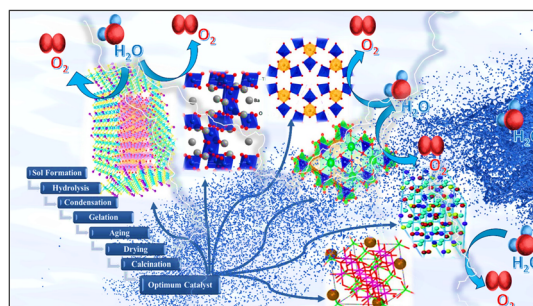
Nitin Goyal, Fei Li\* and Yi-bo Hu\*



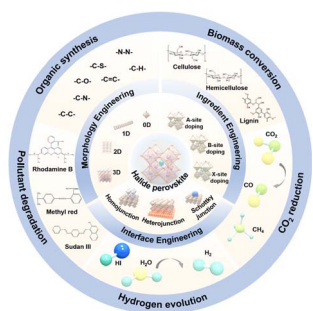
19720

## Sol-gel-derived nanostructured electrocatalysts for oxygen evolution reaction: a review

Aditi De, Min Seo Kim, Arindam Adhikari, Rajkumar Patel\* and Subrata Kundu\*



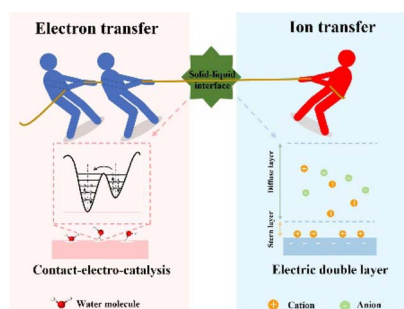
19757



## Halide perovskite for enhancing photocatalytic efficiency: basic characteristics, nanostructure engineering and applications

Yuxin Zhang, Zhihao Yu,<sup>\*</sup> Ming Zhang, Runyu Liu, Jian Xiong, Yina Qiao and Xuebin Lu<sup>\*</sup>

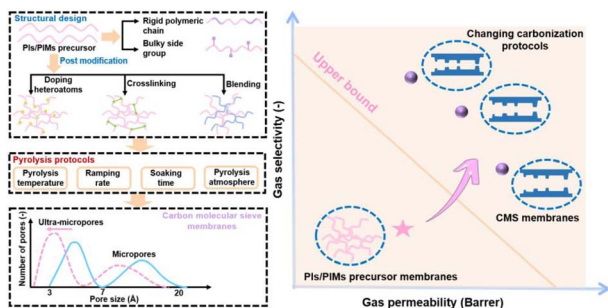
19783



## Contact-electro-catalysis under natural and industrial conditions: mechanisms, strategies, and challenges

Xinnan Li and Wangshu Tong<sup>\*</sup>

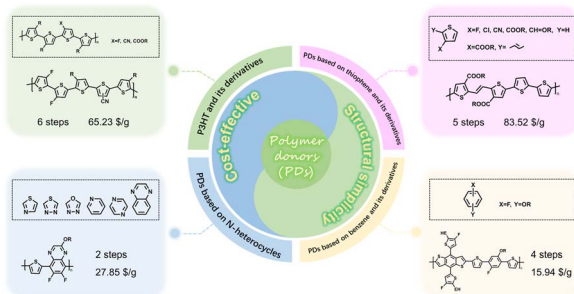
19806



## Next-generation carbon molecule sieve membranes derived from polyimides and polymers of intrinsic microporosity for key energy intensive gas separations and carbon capture

Min Deng, Jing Wei, Yulei Ma, Zikang Qin, Jia Song, Lin Yang, Lu Yao, Wenju Jiang, Shouliang Yi,<sup>\*</sup> Nanwen Li<sup>\*</sup> and Zhongde Dai<sup>\*</sup>

19839



## Cost-effective polymer donors with simple structure for organic solar cells

Xue Zhou, Chuantao Gu,<sup>\*</sup> Chunying Zheng, Bing Liu, Yong Tian, Huan Yang, Jiping Ma and Xichang Bao<sup>\*</sup>

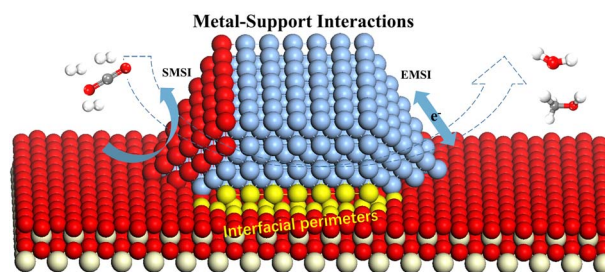


## REVIEWS

19861

**Catalyst architecture for metal–support interactions and its effects on heterogeneous reactions**

Bin Yang, Xiaochen Chen, Limin Guo and Lingxia Zhang\*

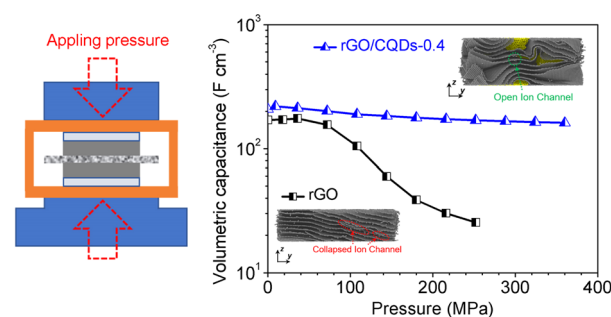


## COMMUNICATION

19885

**Carbon quantum dots-embedded reduced graphene oxide compact films for highly pressure-tolerant electrodes**

Dou Lin, Ziyang Zhou, Ronghao Shi,\* Bin Chen, Zhulin Huang, Haibin Tang,\* Jun Wang, Xiaoguang Zhu, Cheng Shao and Fangming Han\*

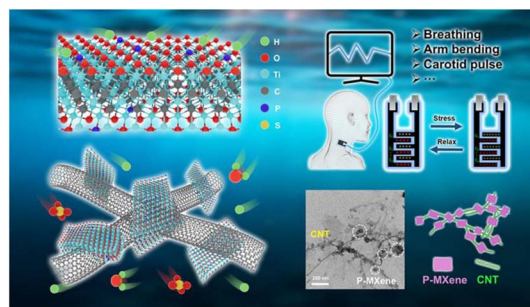


## PAPERS

19891

**Carbon nanotube cross-linked phosphorus-doped MXene for capacitive pressure microsensors**

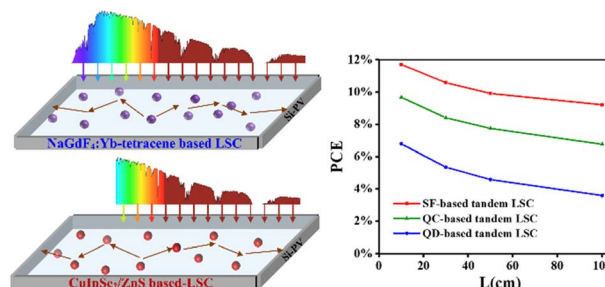
Wenshuai Yang, Shifan Zhu, Chenyang Hao, Tailong Ji, Yuanyuan Liu\* and Yuqiao Wang\*



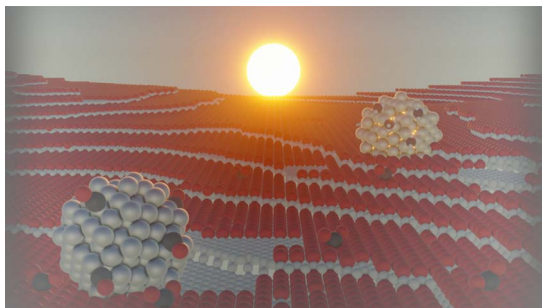
19899

**Exploring the optical management and efficiency limit of luminescent solar concentrators based on advanced luminophores**

Qi Nie, Wenqing Li, Kuilin Li and Xiao Luo\*



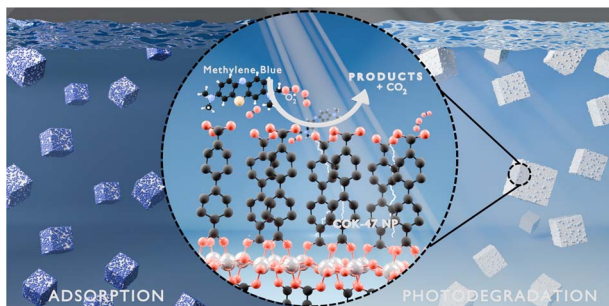
19910



### Non-oxidative calcination enhances the methane dry reforming performance of Ni/CeO<sub>2-x</sub> catalysts under thermal and photo-thermal conditions

Kristijan Lorber, Vasyl Shvalya, Janez Zavašnik, Damjan Vengust, Iztok Arčon, Matej Huš, Andraž Pavličič, Janvit Teržan, Uroš Cvelbar, Blaž Likozar and Petar Djinović\*

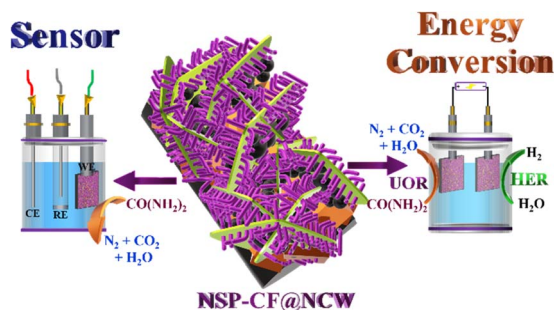
19924



### Harnessing a Ti-based MOF for selective adsorption and visible-light-driven water remediation

Stephen Nagaraju Myakala, Magdalena Ladisich, Pablo Ayala, Hannah Rabl, Samar Batool, Michael S. Elsaesser, Alexey Cherevan\* and Dominik Eder\*

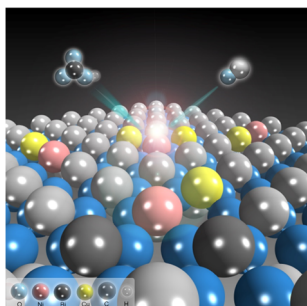
19935



### Microstructural and electron framework-engineered 3D NiSeP-integrated CuFe composites as trifunctional electrocatalysts for sensing and urea-assisted water-splitting applications

Ameer Farithkhan, N. S. K. Gowthaman,\* Raju Suresh Kumar, Krishnapandi Alagumalai, Wei Sea Chang\* and Sankaran Meenakshi\*

19950



### Designing atomic Ni/Cu pairs on a reactive BiOCl surface for efficient photo-chemical HCO<sub>3</sub><sup>-</sup>-to-CO conversion

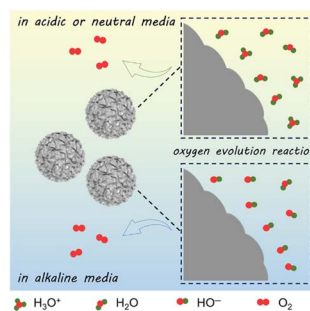
Da Ke, Bingjie Sun, Yanjun Zhang, Fan Tian, Yu Chen, Qingwen Meng, Yixuan Zhang, Zhangyi Hu, Hongzhou Yang, Chenyu Yang, Xuyang Xiong\* and Tengfei Zhou\*



19958

### Wrinkled Ir-MnO<sub>x</sub> nanospheres as pH-universal electrocatalysts for oxygen evolution reaction

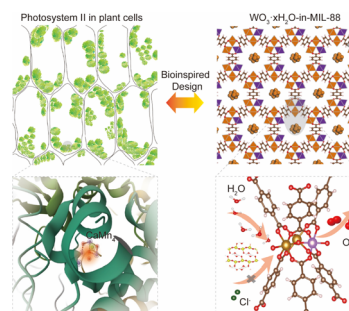
Li Quan, Yirong Cao, Jinlong Liu,\* Bao Yu Xia, Xin Zhao\* and Bo You\*



19968

### Tungstic acid integrated metal-organic frameworks for efficient oxygen evolution reaction

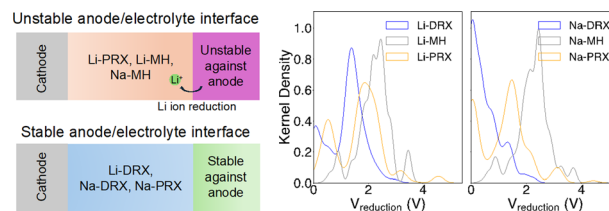
Zicheng Huang, Wenjie Shao, Yijuan Zheng, Junyu Wang, Mao Wang, Shuang Li, Xiaohui Xu,\* Chong Cheng\* and Changsheng Zhao\*



19979

### Design principles for anode stable solid-state electrolytes

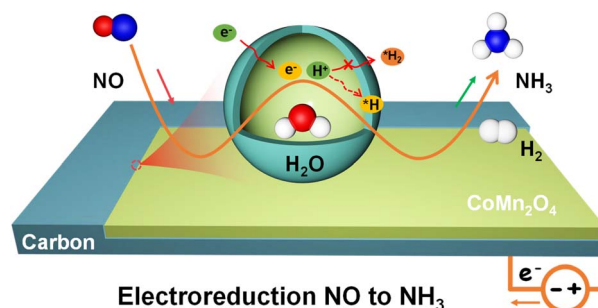
Tan-Lien Pham, Lin Wang and Bin Ouyang\*



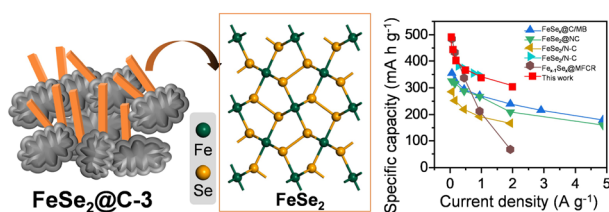
19988

### Efficient electrocatalytic nitric oxide reduction to ammonia using manganese spinel oxides

Zhaodong Niu, Shiyang Fan and Xinyong Li\*



19995

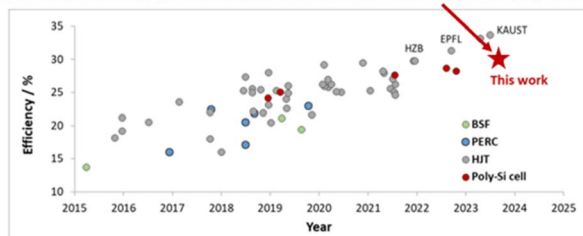


### Constructing FeSe<sub>2</sub> nanorods supported on ketjenblack with superior cyclability for potassium-ion batteries

Bi-Cui Chen, Xian Lu, Hou-Yang Zhong, Pei-Weng Huang, Ya-Nan Wu, Si-Yu Xu, Xue-You Tan\* and Xiao-Hui Wu\*

20006

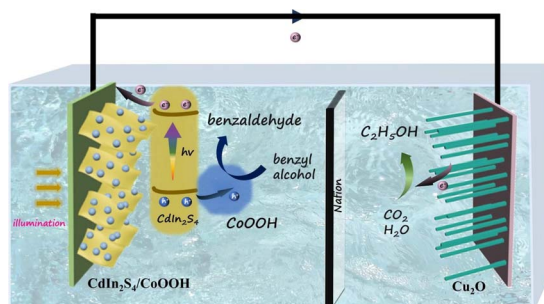
Over 29% monolithic perovskite/silicon tandem solar cells based on poly-Si cells



### Over 29%-efficient, stable n-i-p monolithic perovskite/silicon tandem solar cells based on double-sided poly-Si/SiO<sub>2</sub> passivating contact silicon cells

Leiping Duan, Sieu Pheng Phang, Di Yan, Josua Stuckelberger, Daniel Walter, Yihui Hou, Wei Wang, Nathan Chang, Anh Dinh Bui, Azul Osorio Mayon, Lichun Chang, Di Kang, The Duong, Rabin Basnet, Hieu Nguyen, Thomas White, James Bullock, Klaus Weber, Daniel MacDonald,\* Kylie Catchpole\* and Heping Shen\*

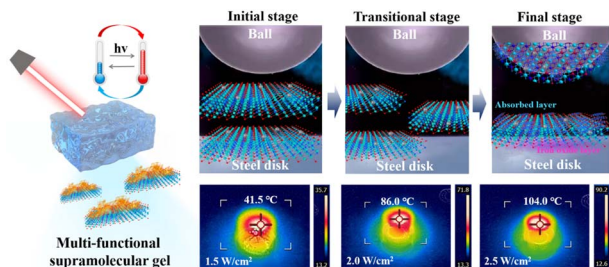
20017



### CoOOH/CdIn<sub>2</sub>S<sub>4</sub> film photoanodes driving unbiased tandem cells towards simultaneous efficient oxidation of benzyl alcohol and selective generation of ethanol from CO<sub>2</sub> reduction

Yiqing Wei, Huichao He,\* Shuyuan Yang, Yongcai Zhang, Xin Zhou,\* Zhigang Zou and Yong Zhou\*

20025



### Enhanced lubrication and photothermal conversion via dynamically reversible supramolecular oil gels filled with MXene@mGLM composites

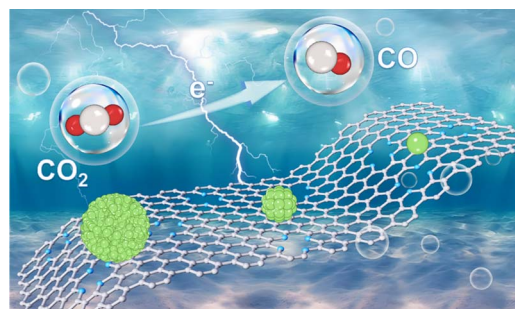
Yuhong Cui, Tiantian Wang, Guangkai Jin, Shiyuan Wang, Shujuan Liu, Qian Ye,\* Feng Zhou and Weimin Liu



20035

### Size effect of nickel from nanoparticles to clusters to single atoms for electrochemical CO<sub>2</sub> reduction

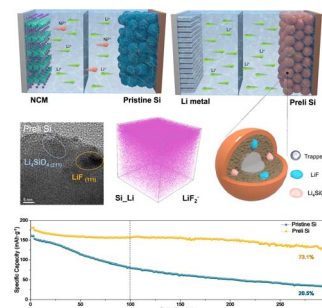
Qin Pan, Yang Chen,\* Hui Li, Guanghuan Ma, Shuoshuo Jiang, Xin Cui, Lei Zhang, Yuxin Bao and Tianyi Ma\*



20045

### Essence of electrochemical prelithiation of the silicon anode: from the interface to the bulk phase

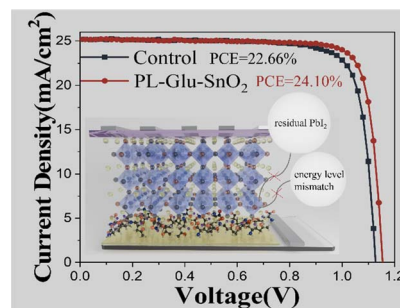
Yuchen Li, Linze Lv, Rui Liang, Longfei Wang, Yan Wang, Qunting Qu,\* Ming Shen and Honghe Zheng\*



20056

### Amino acid salt induced PbI<sub>2</sub> crystal orientation optimization for high-efficiency perovskite solar cells with long-term stability

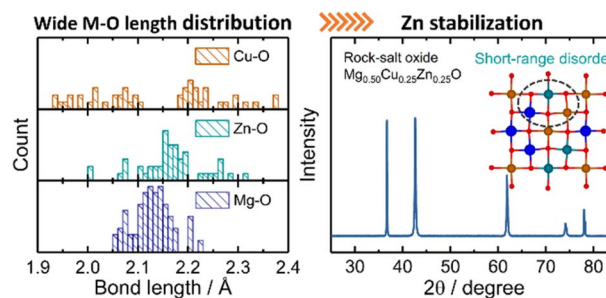
Jiangying Lu, Yulin Wu, Shan Wu, Jing Zhao, Jinyao Wang, Runkang Lin, Huayi Zou, Shudi Lu, Kong Liu, Shizhong Yue,\* Zhijie Wang, Liya Zhou\* and Shengchun Qu\*



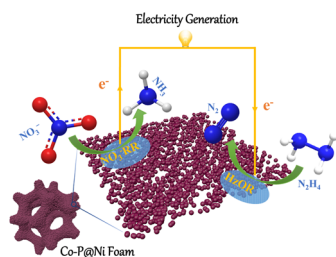
20064

### Short-range disorder mediated stability of Zn in rock-salt MgO beyond configurational entropy

Shengnan Sun,\* Jun Zhou, Shibo Xi, Hui Ru Tan, Fengxia Wei, Debbie Hwee Leng Seng, Wei Ying Lieu, Yi Ren, Shijie Wang\* and Zhi Wei Seh\*



20077

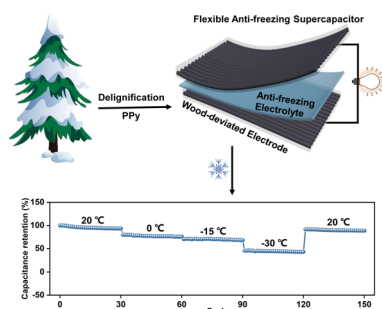


- ✓  $j_{\text{NH}_3}$  of 2 A cm<sup>-2</sup> at -0.3 V with  $FE_{\text{NH}_3}$  of 91%
- ✓ High stability of  $j$  over 800 mA cm<sup>-2</sup> for 82h

### Electrochemical reduction of nitrate to ammonia on ultra-stable amorphous Co–P electrocatalyst

Jin-Long Fan, Sheng-Bo Liu, Ming-Liang Chen, Zhangxiang Wu, Sheng-Peng Sun\* and Yao-Yin Lou\*

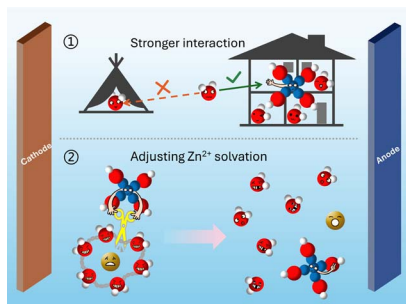
20088



### Wood-derived flexible supercapacitors for anti-freezing green power sources

Hongting Ma, Qian Zhao, Peihao Cheng, Xiaodong Geng, Huannuo Tao, Zhouxiaolong Zhang, Yue Jiang, Junlin Ma, Kai Yang, Quanli Liu, Hanwen Zhang, Zhida Liang, Jian Li,\* Tianlu Wang,\* Mianqi Xue\* and Nan Zhu\*

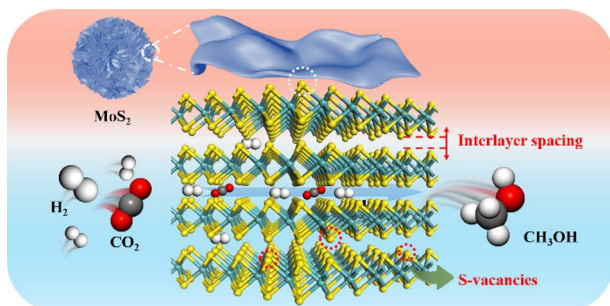
20097



### Breaking hydrogen-bonds in aqueous electrolytes towards highly reversible zinc-ion batteries

Yilong Zhu, Qianru Chen, Junnan Hao\* and Yan Jiao\*

20107



### Enhancing CO<sub>2</sub> hydrogenation to methanol via the synergistic effect of MoS<sub>2</sub> interlayer spacing and sulfur vacancies

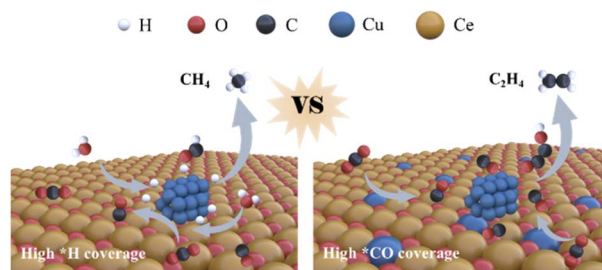
Langlang Qin, Yunfei Gao,\* Caiyun Han, Minghui Zhu and Shuang Wang\*



20115

### Customized CO<sub>2</sub> electroreduction to methane or ethylene by manipulating \*H and \*CO adsorption on Cu/CeO<sub>x</sub> catalysts

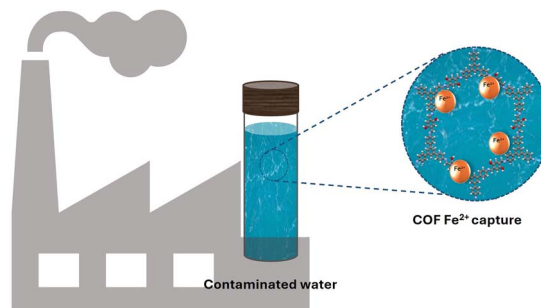
Tinghui Yang, Yingbing Zhang, Zichao Huang, Jianping Yang\* and Min Kuang\*



20121

### Imine-based covalent organic framework gels for efficient removal of Fe<sup>2+</sup> from contaminated water

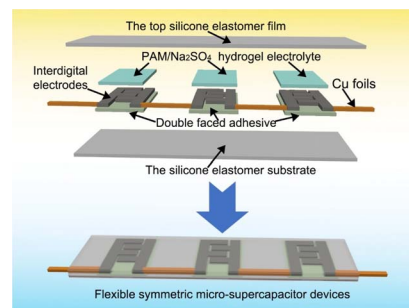
Cristina Arqueros, Lorena Welte, Carmen Montoro\* and Félix Zamora\*



20129

### Dual design of electrodes and electrolytes ensures flexible symmetric micro-supercapacitors with high energy density

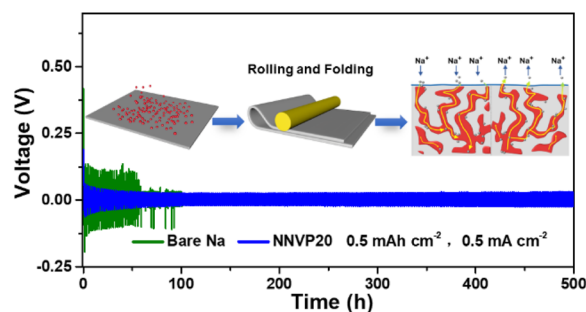
Zhiqian Cao,\* Jingzhi Tao and Yudong Wu\*



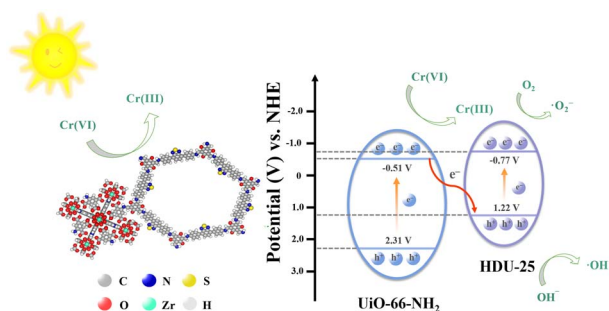
20137

### Constructing sodiophilic interconnected ion-transport channels towards a stable Na-metal anode

Yi Ding, Min Guo,\* Yawei Zhang, Song Lu,\* Jiadi Ying, Yeqing Wang, Tiancun Liu and Zhixin Yu\*



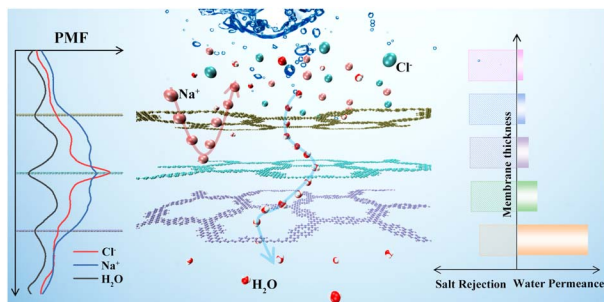
20149



### High-efficiency photocatalytic reduction of Cr(VI) by Z-scheme electron transfer in UiO-66-NH<sub>2</sub>@HDU-25 heterojunctions

Wen Lu, Chen Wang, Wenhui Song, Zhixiong Zhang, Chengde Xie and Jianjun Wang\*

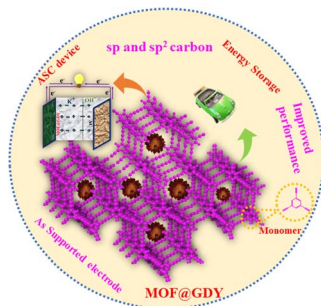
20160



### High-performance desalination through tortuous pathways in multilayer ABC-stacked large-pore covalent organic frameworks: a theoretical study

Wenfeng Wu, Yixiang Li, Yong-Qiang Li, Mingwen Zhao, Weifeng Li\* and Yuanyuan Qu\*

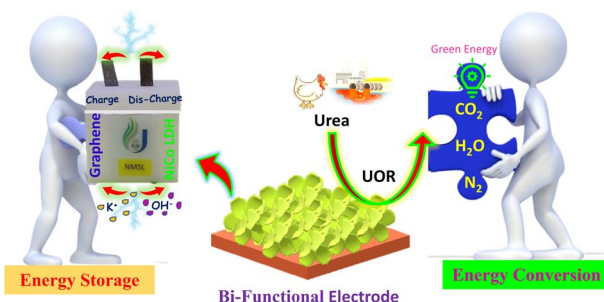
20170



### Crumpled fibrous graphdiyne network decorated metal-organic framework: a promising heterostructure for improved energy storage performance

Zahir Abbas, Nissar Hussain and Shaikh M. Mobin\*

20179



### Unveiling the effect of growth time on bifunctional layered hydroxide electrodes for high-performance energy storage and green energy conversion

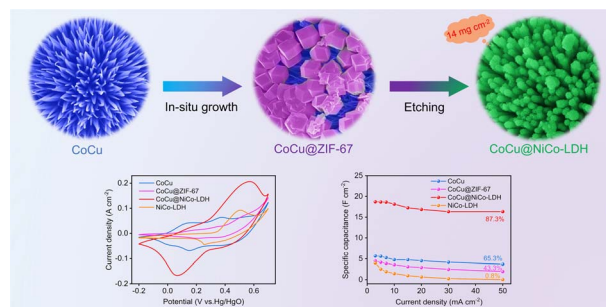
Jyoti Prakash Das, Swapnil Shital Nardekar, Dhanasekar Kesavan, Kousik Bhunia, Vishwanathan Ravichandran and Sang-Jae Kim\*



20191

### A ZIF-67 derived NiCo-LDH nanosheet–nanourchin 3D hierarchical nanostructure for high-performance supercapacitors

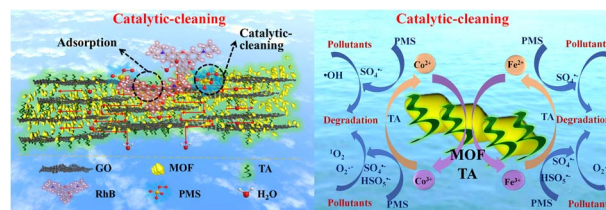
Hongtao Zhou, Xuefeng Sha, Fan Zeng, Xueli Wu, Minghao Yu, Zhidan Shi, Xingang Zhang,\* Xianyin Song\* and Changzhong Jiang\*



20202

### Constructing a highly permeable bioinspired rigid-flexible coupled membrane with a high content of spindle-type MOF: efficient adsorption separation of water-soluble pollutants

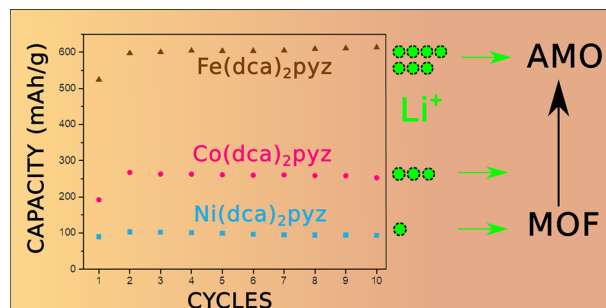
Ruilong Zhang, Jun Zhao,\* Xiaohua Tian, Jian Ye, Lulu Wang, Ifunanya Rejoice Akaniro, Jianming Pan\* and Jiangdong Dai\*



20215

### Electrochemical performance of M(dca)<sub>2</sub>pyz (M = Fe, Co and Ni) MOFs as sustainable anodes in lithium-ion batteries

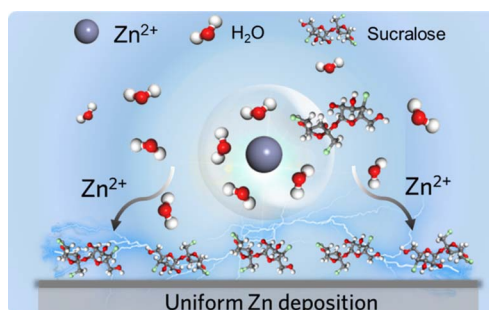
Isabel Ciria-Ramos, Alberto García-Fernández, Álvaro Mayoral, Alodia Orera, Emilio J. Juárez-Perez\* and Marta Haro\*



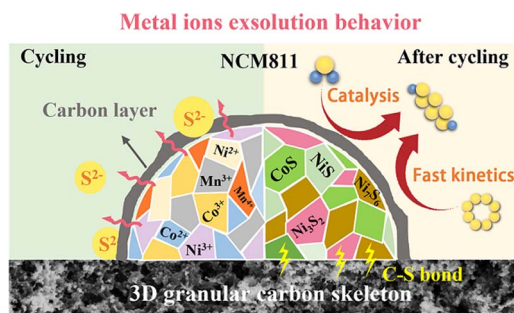
20229

### Sucralose with bifunctional groups as a functional additive enhancing the interfacial stability of zinc metal anodes *via* interfacial molecular chemistry regulation

Huan Liu, Zijun Xin, Bin Cao,\* Di Zhang, Jie Lu, Yiwen Zhang, Zhijing Xu, Hongjuan Lai, Mengjiao Du and Zirong Guo



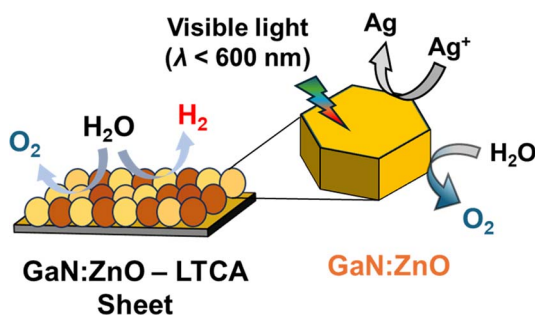
20238



### Metal-ion exsolution effect to accelerate the reaction kinetics in Li–S batteries

Hongxu Zhou, Weichen Han, Hongquan Chai, Hao Huang, Jingang Zheng, Han Zhang,\* Lixiang Li, Weimin Zhou, Baigang An and Chengguo Sun\*

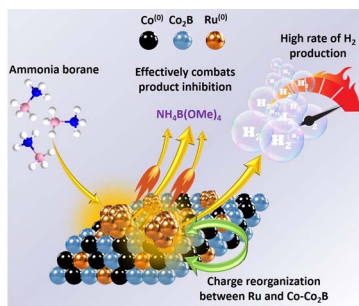
20247



### Long-wavelength photoresponsive gallium zinc oxynitride for efficient oxygen evolution and Z-scheme water splitting reactions

Natsutogi Iwasa, Hiroka Sandaiji, Swarnava Nandy, Mamiko Nakabayashi, Tsuyoshi Takata, Takashi Hisatomi\* and Kazunari Domen\*

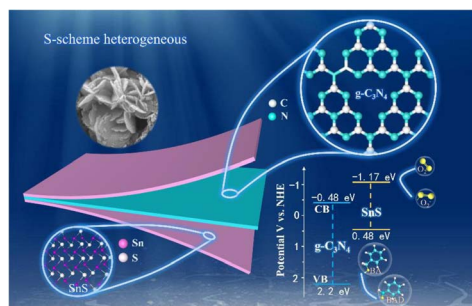
20256



### A Ru atomic cluster-installed Co–Co<sub>2</sub>B nanocatalyst remarkably combats product inhibition while sustaining high turnover frequency of hydrogen production

Rajani Kumar Borah, Priti Singh, Mudit Dixit and Amit A. Vernekar\*

20270



### Stannum vacancies at precise interface of 2D/2D g-C<sub>3</sub>N<sub>4</sub>/SnS S-scheme heterojunction boost up photocatalysis

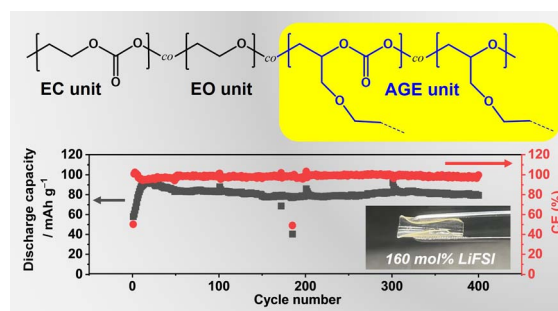
Huiming Shi, Quanquan Shi,\* Sanwal Piracha and Gao Li\*



20278

### A highly salt concentrated ethylene carbonate-based self-standing copolymer electrolyte for solid-state lithium metal batteries

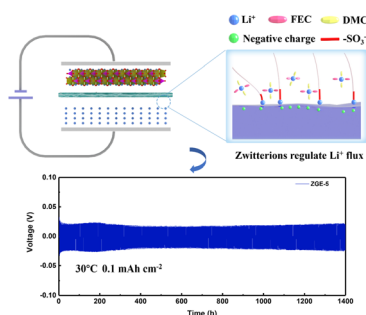
Nantapat Soontornnon, Kento Kimura and Yoichi Tominaga\*



20288

### The role of zwitterionic crosslinks in facilitating ion conduction, lithium deposition, and stable interface formation for polymer electrolyte-based lithium metal batteries

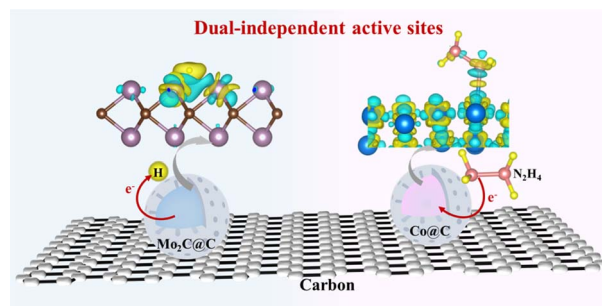
Liang Chai, Zhiheng Zou, Zhengsheng Yang and Guang Yang\*



20300

### Dual-independent active sites for efficient hydrogen production

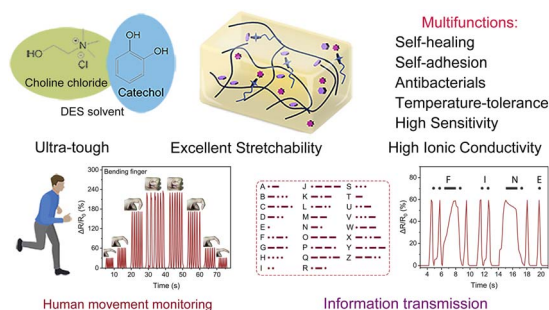
Yangyang Feng,\* Yongxin Guan,\* Lei Wen and Yunxia Liu



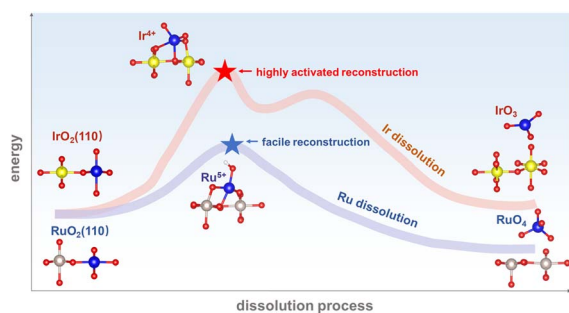
20307

### Physically entangled multifunctional eutectogels for flexible sensors with mechanically robust

Qianwen Lu, Hengfeng Li\* and Zhijian Tan\*



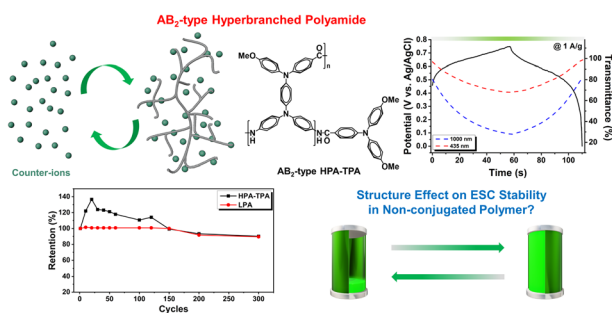
20317



## The origin of high electrochemical stability of iridium oxides for oxygen evolution

Yunlong Ding, Wenwen Liu, Zirui Xu and Zhiyao Duan\*

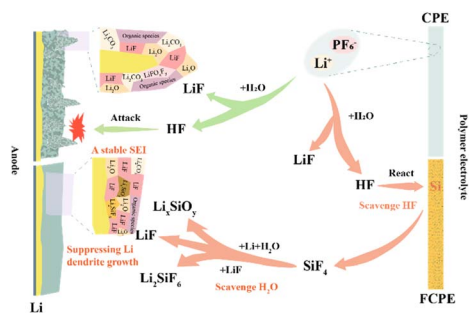
20327



## Non-conjugated electrochromic supercapacitors with atom-economic arylamine-based AB<sub>2</sub>-polyamides

Yu-Jen Shao, Yi-Ju Cho, Hou-Lin Li, Chien-Chieh Hu\* and Guey-Sheng Liou\*

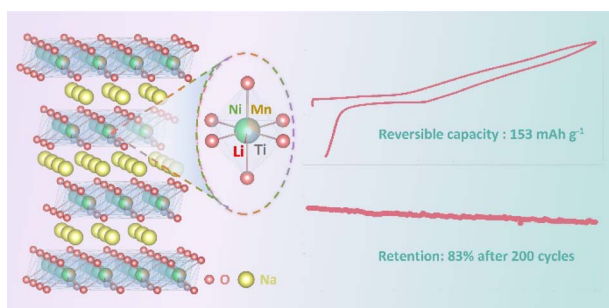
20337



## A functional silicon composite polymer electrolyte with hydrofluoric acid scavenging for quasi-solid-state lithium metal batteries

Li Zhao, Li Yang, Yu Cheng, Hong Zhang, Lulu Du, Wei Peng, Ahmed Eissa Abdelmaoula and Lin Xu\*

20348



## A highly stable high-energy layered oxide cathode for rechargeable sodium ion batteries

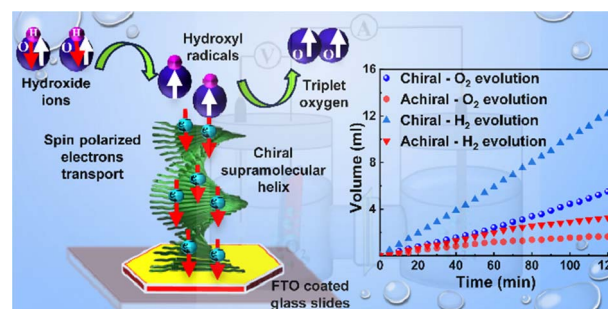
Ting Li, Yangyang Zhang, Yushuo Zhang, Xingde Xiang,\* Song Liu\* and Chunxia Chen\*



20354

## Chiral supramolecular polymer functionalized two-dimensional transition metal-based catalyst for enhancing the electrochemical water splitting via spin-polarized charge transfer

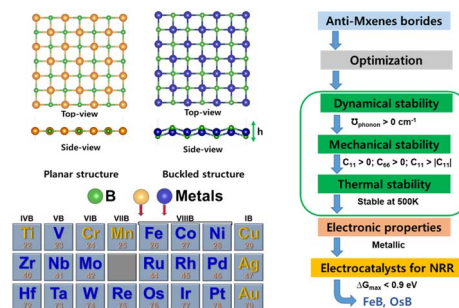
Utkarsh Utkarsh, Sai Rachana Pramatha, Anujit Balo, Utpal Kumar Gosh, Kotagiri Venkata Rao\* and Koyel Banerjee Ghosh\*



20364

## 2D anti-MXene boride monolayers: unveiling a promising new family of catalysts for the nitrogen reduction reaction

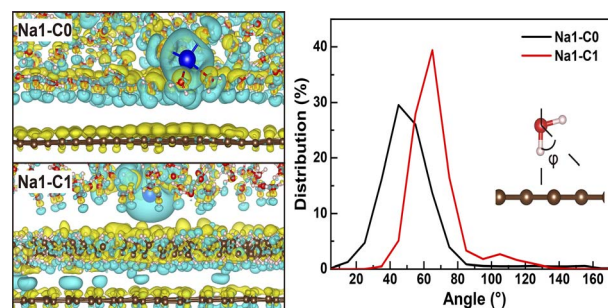
Viet Q. Bui\* and Dinh Quang Khieu



20378

## Effect of alkane adsorption on the electrochemical properties of graphene

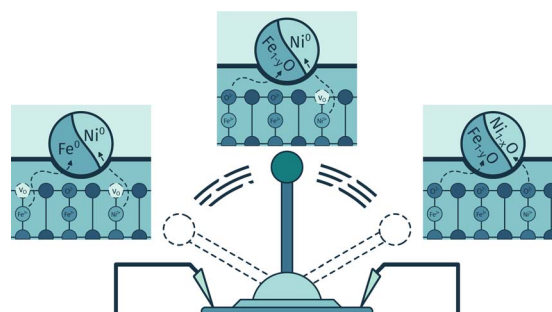
Jie Tian, Yifeng Zhang, Xueqing Zuo, Chengwei Li, Zeng Fan\* and Lujun Pan\*



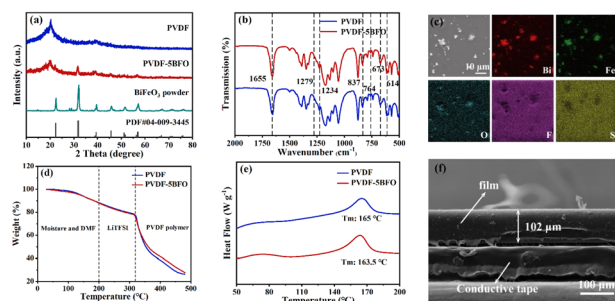
20386

## Electro-tuned catalysts: voltage-controlled activity selection of bimetallic exsolution particles

Harald Summerer,\* Kirsten Rath, Andreas Nenning, Thomas Schachinger, Michael Stöger-Pollach, Christoph Rameshan and Alexander K. Opitz



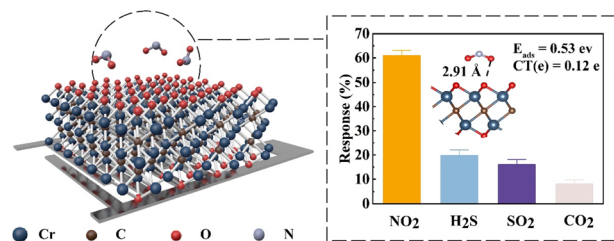
20403



### Ferroelectric BiFeO<sub>3</sub> modified PVDF-based electrolytes for high-performance lithium metal batteries

Yanmei Wu, Hong Zhang, Yilin Xu, Zhiruo Tang and Zhicheng Li\*

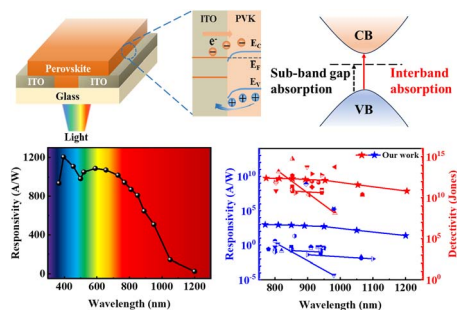
20414



### Defective Cr<sub>2</sub>CT<sub>x</sub>-based sensors with high sensitivity for NO<sub>2</sub> detection at room temperature

Liangchao Guo, Haoran Han, Junke Wang, Peng Wang, Chunyu Du, Bo Wang, Qilong Yuan, Yongbiao Zhai\* and Chao Zhang\*

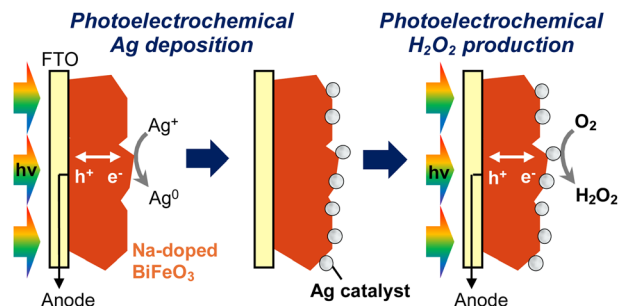
20425



### Regulating energy band alignment for high-performance broadband perovskite photodetectors

Jun Wu, Yuchen Miao, Xiaorong Qi, Liu Yang, Xu Wang, Fei Zheng, Feiyu Zhao, Zhenfu Zhao, Shareen Shafique, Houcheng Zhang and Ziyang Hu\*

20437



### Atomic doping to enhance the p-type behavior of BiFeO<sub>3</sub> photoelectrodes for solar H<sub>2</sub>O<sub>2</sub> production

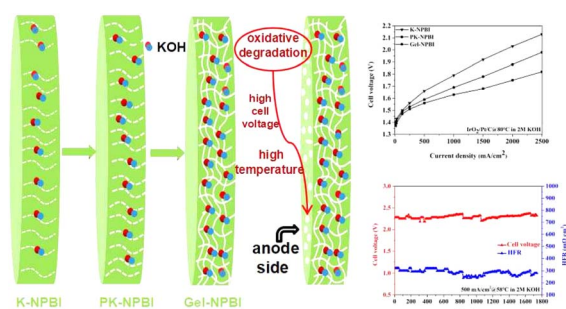
Daye Seo, Andrew Grieder, Andjela Radmilovic, Sophya F. Alamudun, Xin Yuan, Yuan Ping\* and Kyoung-Shin Choi\*



20449

## Highly ion conductive ion solvating membranes for durable alkaline water electrolysis at low temperature and voltage

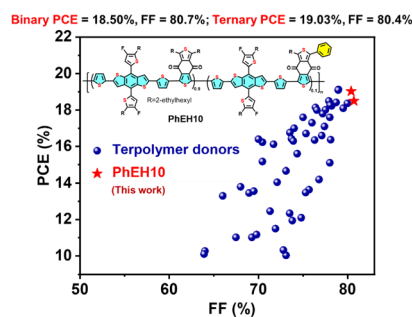
Bin Hu, Zhongyan Li, Lei Liu,\* Min Liu, Yingda Huang, Tiegeng Guo, Rong Zhang, Kang Geng\* and Nanwen Li\*



20459

## Monophenyl-featured side-chain-random terpolymers for organic solar cells with an efficiency beyond 19%

Deng Zhou, Lingchen Kong, Lianjie Zhang,\* Jiafeng Zhang, Mingqing Chen, Xinkang Wang, Xunchang Wang, Dongge Ma, Renqiang Yang\* and Junwu Chen\*



20469

## Influence of microstructure evolution on the discharge properties of the Al–Mg–Sn–Ga–In anode for Al–air batteries

Xuehong Xu, Jin Zhang, Wei Jiang and Yunlai Deng\*

