

# Journal of Materials Chemistry A

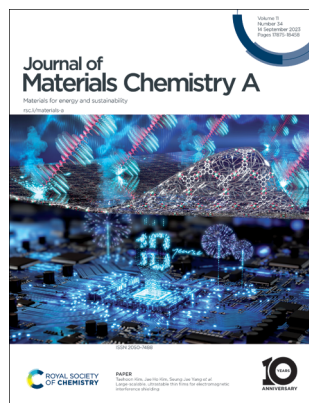
Materials for energy and sustainability

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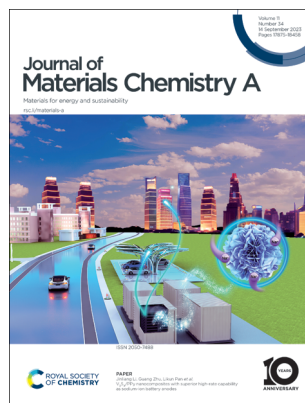
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ISSN 2050-7488 CODEN JMCAET 11(34) 17875–18458 (2023)



### Cover

See Taehoon Kim, Jae Ho Kim, Seung Jae Yang *et al.*, pp. 18188–18194. Image reproduced by permission of Seung Jae Yang from *J. Mater. Chem. A*, 2023, **11**, 18188.



### Inside cover

See Jinliang Li, Guang Zhu, Likun Pan *et al.*, pp. 18089–18096. Image reproduced by permission of Jinliang Li from *J. Mater. Chem. A*, 2023, **11**, 18089.

## EDITORIAL

17891

### Introduction to 1D/2D materials for energy, medicine and devices

Yu Chen, Gemma-Louise Davies,\* Anders Hagfeldt and Nicholas Kotov

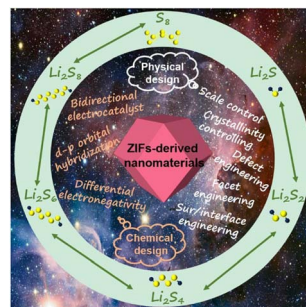


## REVIEWS

17892

### Recent progress in zeolitic imidazolate frameworks (ZIFs)-derived nanomaterials for effective lithium polysulfide management in lithium–sulfur batteries

Mengjie Zhang, Hanshu Mao, Yeru Liang and Xiaoyuan Yu\*



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## Thermodynamics of calcined clays used in cementitious binders: origin to service life considerations

The diagram illustrates the clay processing chain. It begins with 'geology' (represented by a landscape with a sun and a river) leading to 'natural weathering or accelerating' (represented by a pile of brown clay). This step is associated with a circular icon containing a stylized 'S' shape. The next step is 'Calcination' (represented by a factory with smokestacks), which involves '+ impurities' and '+ additives'. The final stage is 'Use in construction materials' (represented by a city skyline), which leads to 'end of life deposition' (represented by a pile of dark brown material). A green bar at the bottom indicates the scope of 'thermodynamic modeling' across the entire process.

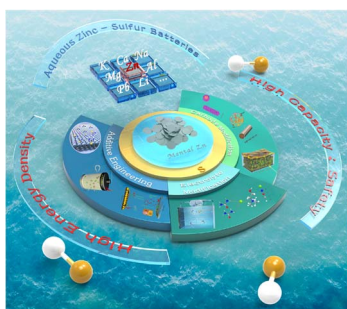
## Selective CO<sub>2</sub> hydrogenation over zeolite-based catalysts for targeted high-value products

## Recent advances in exsolved perovskite oxide construction: exsolution theory, modulation, challenges, and prospects

## Solid oxide electrolysis cells – current material development and industrial application

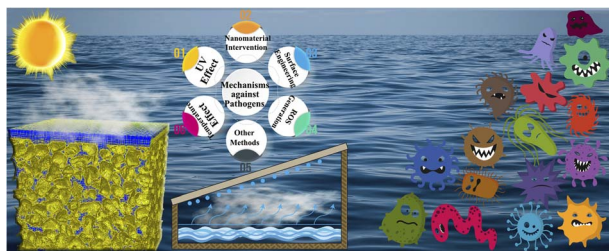
The diagram illustrates the components of a solid oxide fuel cell (SOFC). At the center is a blue circle labeled "High-temperature electrolysis". Surrounding this central unit are four other components, each in a colored circle, connected by arrows indicating flow or connection:

- Fuel electrode** (orange circle) at the top, with an arrow pointing down to the central unit.
- Air electrode** (brown circle) at the bottom, with an arrow pointing up to the central unit.
- Electrolyte** (grey circle) on the left, with an arrow pointing right to the central unit.
- Briefly: Interconnect, sealing** (red circle) on the right, with an arrow pointing left to the central unit.

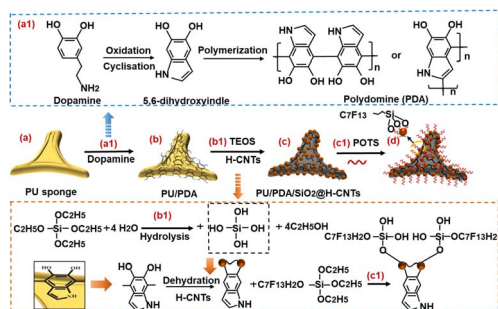


Chenlong Feng, Xinyuan Jiang, Qiuping Zhou, Tangsuo Li,  
Yufei Zhao, Zhaojian Niu, Yuchao Wu, He Zhou,  
Mengyao Wang, Xuecheng Zhang, Ming Chen, Lubin Ni,\*  
Guowang Diao\* and Yongge Wei\*

Seyed Masoud Parsa,\* Fatemeh Norozpour,  
Saba Momeni, Shahin Shoeibi, Xiangkang Zeng, Zafar Said,  
Wenshan Guo, Huu Hao Ngo and Bing-Jie Ni

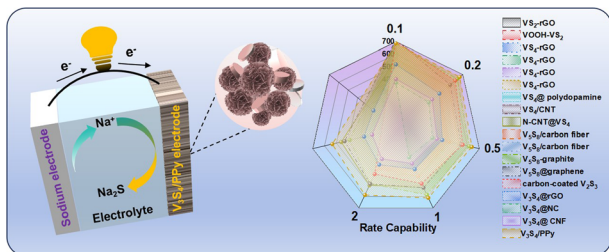


## 18081



Zhanjian Liu,\* Jinyue Yang, Jing Jing, Xiguang Zhang,  
Yuxin Fu, Meiling Li, Ruixia Yuan and Huaiyuan Wang

## 18089



Yajuan Zhang, Yue Li, Guangzhen Zhao, Lu Han, Ting Lu,  
Jinliang Li,\* Guang Zhu\* and Likun Pan\*

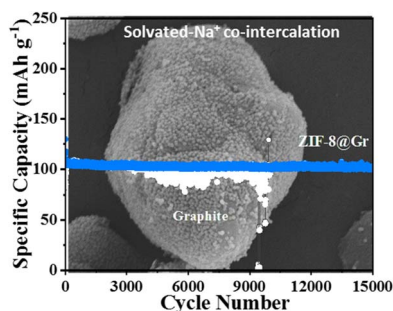


## PAPERS

18097

**ZIF-8 coating on graphite: a high-rate and long-term cycling anode for sodium-ion capacitors**

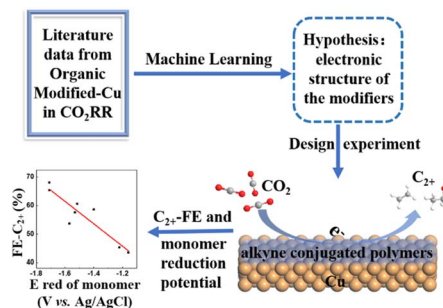
Xueying Liang, Zhifei Mao, Xiaojun Shi, Taoqiu Zhang, Zhi Zheng, Jun Jin, Beibei He, Rui Wang, Yansheng Gong and Huanwen Wang\*



18106

**Uncovering the influence of the modifier redox potential on CO<sub>2</sub> reduction through combined data-driven machine learning and hypothesis-driven experimentation**

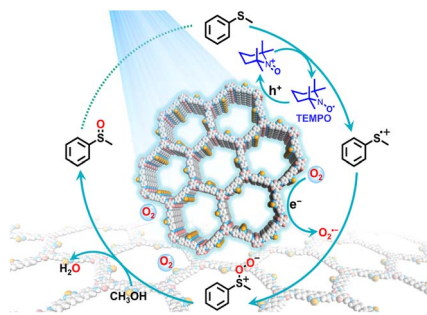
Xinru He, Yuming Su, Jieyu Zhu, Nan Fang, YangTao Chen, Huichong Liu, Da Zhou\* and Cheng Wang\*



18115

**The synergy between a benzoselenadiazole covalent organic framework and TEMPO for selective photocatalytic aerobic oxidation of organic sulfides**

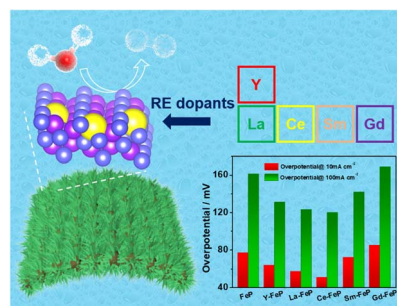
Hongxiang Zhao, Fulin Zhang, Xiaoyun Dong and Xianjun Lang\*



18126

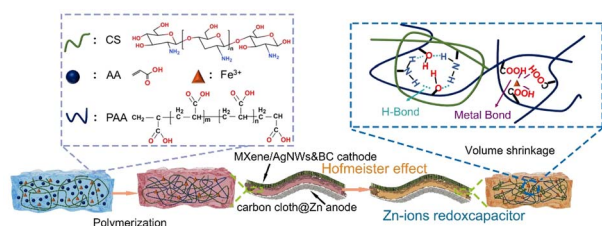
**Engineering the electronic structure of FeP with rare earth elements to enhance the electrocatalytic hydrogen evolution performance**

Wei Gao, Yujie Wu, Xinhao Wan, Jie Gao and Dan Wen\*



## PAPERS

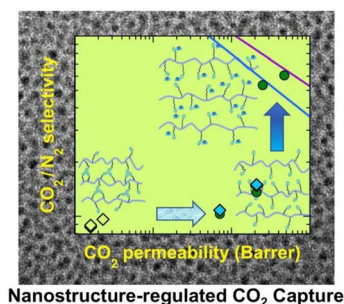
18135



### A Hofmeister effect induced hydrogel electrolyte–electrode interfacial adhesion enhancement strategy for energy-efficient and mechanically robust redoxcapacitors

Yuehui Du, Funian Mo,<sup>\*</sup> Chengbing Qin, Derek Ho and Haibo Hu<sup>\*</sup>

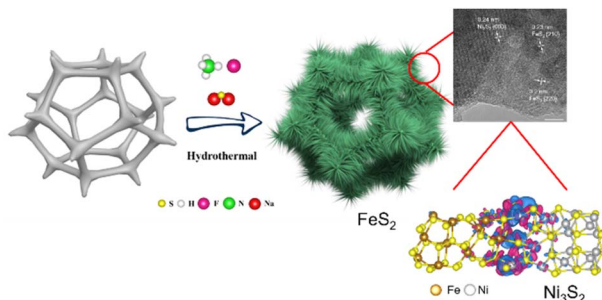
18146



### High-performance carbon-capture membranes developed by (non)solvent-induced nanostructural rearrangement in Nafion

Jing Wei, Jing Deng, Yulei Ma, Zikang Qin, Bangda Wang, Liyuan Deng,<sup>\*</sup> Richard J. Spontak and Zhongde Dai<sup>\*</sup>

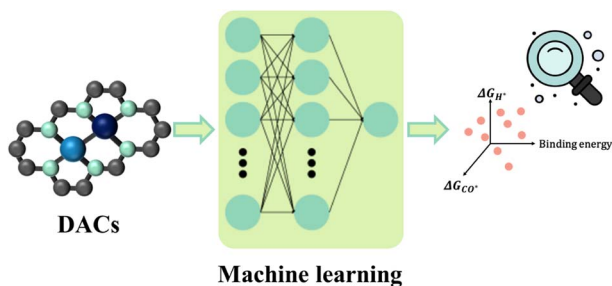
18158



### A highly efficient heterostructure nanorod bifunctional electrocatalyst for realizing enhanced overall water splitting at a large current density

Derun Li, Shixin Wu, Tao Jiang, Shuangshuang Huang, Zhaowu Wang,<sup>\*</sup> Hengyi Wu, Guangxu Cai and Feng Ren<sup>\*</sup>

18168



### Data-driven design of double-atom catalysts with high H<sub>2</sub> evolution activity/CO<sub>2</sub> reduction selectivity based on simple features

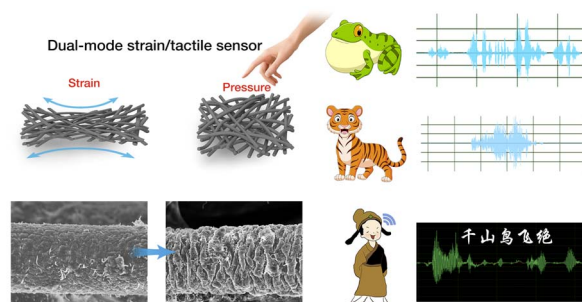
Chenyang Wei, Dingyi Shi, Zhaohui Yang, Zhimin Xue,<sup>\*</sup> Shuzi Liu, Ruiqi Li<sup>\*</sup> and Tiancheng Mu<sup>\*</sup>



18179

## Presenting the shape of sound through a dual-mode strain/tactile sensor

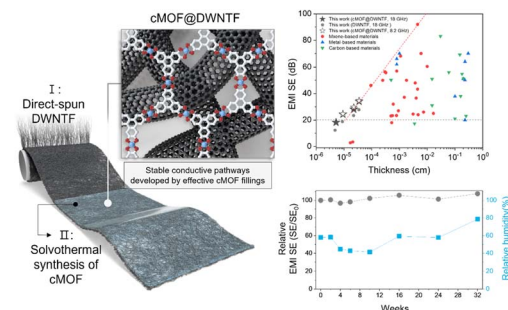
Kangqi Chang, Jiancheng Dong, Yanheng Mao, Yidong Peng, Lei Pu, Jian Meng, Minhao Guo, Piming Ma, Yunpeng Huang\* and Tianxi Liu\*



18188

## Large-scalable, ultrastable thin films for electromagnetic interference shielding

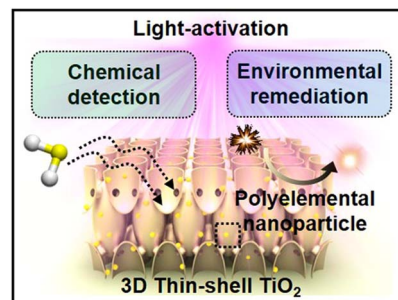
Jae Seo Park, Ji Yong Park, Kyunbae Lee, Young Shik Cho, Hyunji Shin, Yeonsu Jung, Chong Rae Park, Taehoon Kim,\* Jae Ho Kim\* and Seung Jae Yang\*



18195

## Atomically mixed catalysts on a 3D thin-shell TiO<sub>2</sub> for dual-modal chemical detection and neutralization

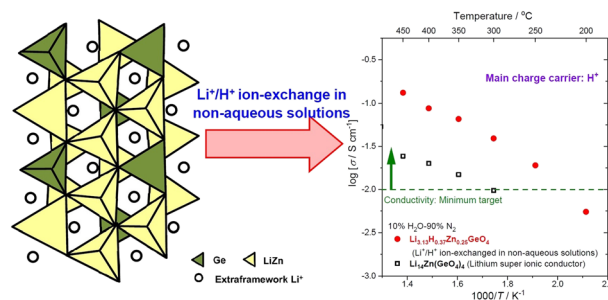
Joonchul Shin, Geonhee Lee, Myungwoo Choi, Huiwon Jang, Yunsung Lim, Gwang-Su Kim, Sang-Hyeon Nam, Seung-Hyub Baek, Hyun-Cheol Song, Jihan Kim, Chong-Yun Kang, Jeong-O. Lee,\* Seokwoo Jeon,\* Donghwi Cho\* and Ji-Soo Jang\*



18207

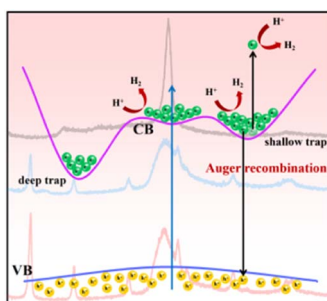
## Intermediate-temperature proton conductivity of Li<sup>+</sup>/H<sup>+</sup> ion-exchanged material (Li,H)<sub>3.5</sub>Zn<sub>0.25</sub>GeO<sub>4</sub>

Toshiaki Matsui,\* Takashi Ozeki, Kazunari Miyazaki, Sadahiro Nagasaka, Hiroki Muroyama, Kenichi Imagawa, Yoshimi Okada and Koichi Eguchi



## PAPERS

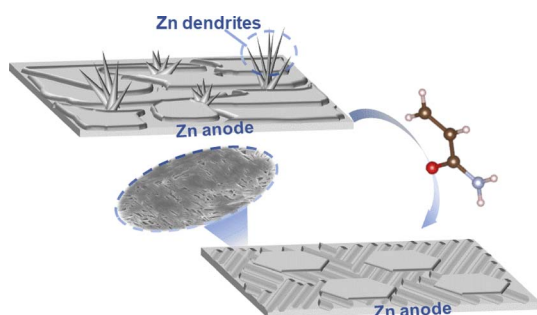
18213



### Sodium ion doped graphitic carbon nitride with high crystallinity for superior photocatalytic hydrogen evolution efficiency

Xue Han, Yuna Kang, Shuang Song, Rong Lu\* and Anchi Yu\*

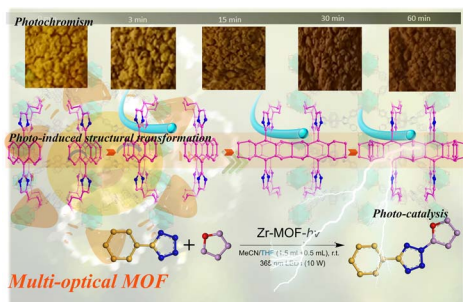
18227



### Achieving a dendrite-free Zn anode at high current densities via *in situ* polymeric interface design

Zhipei Zhong, Wenhao Ren and Suqing Wang\*

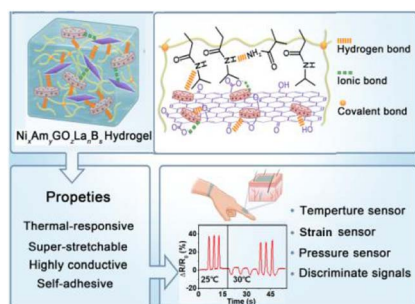
18236



### Enhancing energy transfer through visible-light-driven polymerization in a metal–organic framework

Yuan Chen, Ao-Gang Liu, Peng-Da Liu, Zi-Tong Chen, Shi-Yu Liu and Bao Li\*

18247



### Thermosensitive hydrogel-based, high performance flexible sensors for multi-functional e-skins

Dongdong Lu, Mingning Zhu, Xiaoyuan Li, Zilong Zhu, Xin Lin, Chuan Fei Guo\* and Xiaodong Xiang\*



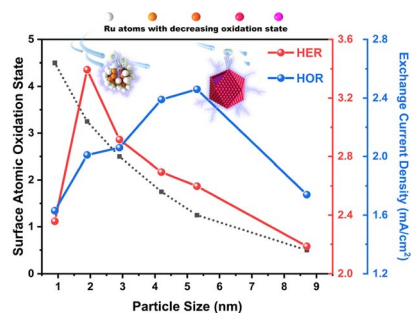


## PAPERS

18262

### Fine-tuning surface oxidation states of ruthenium nanoparticles to enhance hydrogen electrode reactions

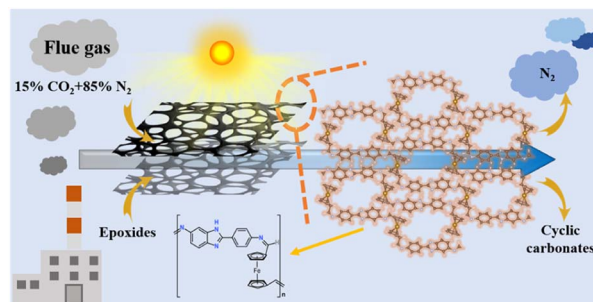
Hao Zhao, Jiejie Li, Jian Zou, Yangchun Tan, Chi Chen, Bo Yang, Qingqing Cheng\* and Hui Yang\*



18272

### A CO<sub>2</sub>-philic ferrocene-based porous organic polymer for solar-driven CO<sub>2</sub> conversion from flue gas

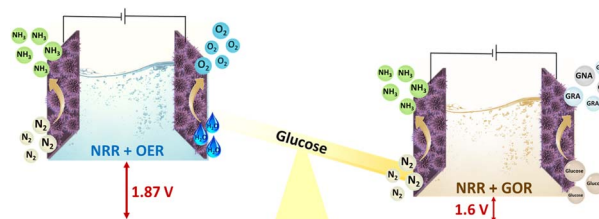
Zhou Fang, Yuqi Wang, Yue Hu, Bing Yao, Zhizhen Ye and Xinsheng Peng\*



18280

### Glucose oxidation assisted ammonia production via electrochemical dinitrogen reduction over CoWO<sub>4</sub>

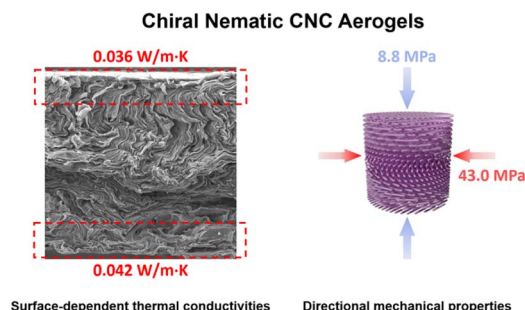
Akansha Chaturvedi, Divyani Gupta, Sukhjot Kaur, Kalpana Garg and Tharamani C. Nagaiah\*



18291

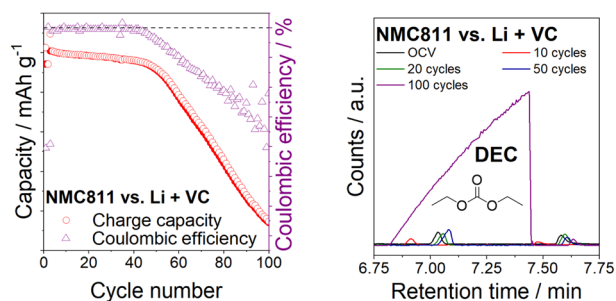
### Exploring the anisotropic properties of chiral nematic cellulose nanocrystal aerogels: outstanding directional mechanical strength and unexpected surface-dependent thermal conductivity

Zongzhe Li, Karl Tsang, Yi-Tao Xu, James G. Drummond, D. Mark Martinez and Mark J. MacLachlan\*



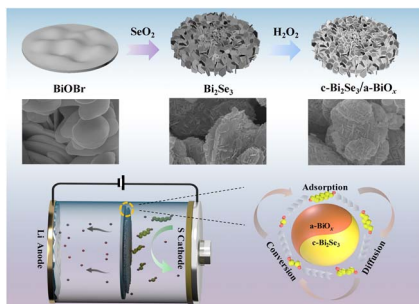
## PAPERS

18302

**Understanding the limits of Li-NMC811 half-cells**

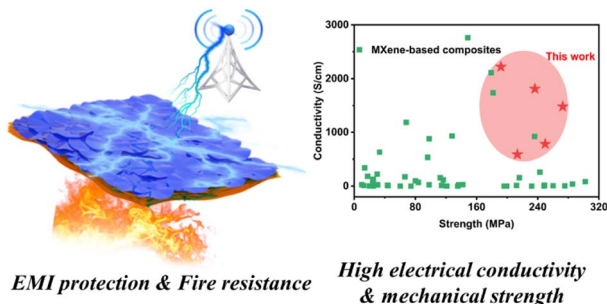
Rory C. McNulty, Elizabeth Hampson, Lewis N. Cutler, Clare P. Grey, Wesley M. Dose and Lee R. Johnson\*

18313

**Amorphous/crystalline heterostructure design enables highly efficient adsorption–diffusion–conversion of polysulfides for lithium–sulfur batteries**

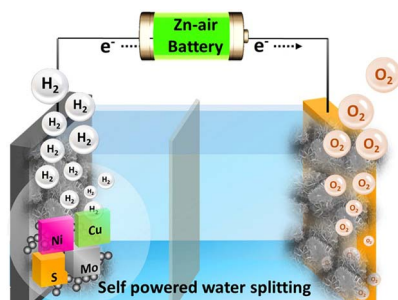
Xiangpeng Wu, Zewei Shen, Daoping Cai,\* Ban Fei, Mincai Zhao, Junjie Fu, Qidi Chen and Hongbing Zhan\*

18323

**Fireproof ultrastrong all-natural cellulose nanofiber/montmorillonite-supported MXene nanocomposites with electromagnetic interference shielding and thermal management multifunctional applications**

Rui Cheng, Ying Wu, Bin Wang,\* Jinsong Zeng, Jinpeng Li,\* Jun Xu, Wenhua Gao and Kefu Chen

18336

**A NiCu–MoS<sub>2</sub> electrocatalyst for pH-universal hydrogen evolution reaction and Zn–air batteries driven self-power water splitting**

Mukesh Kumar and Tharamani C. Nagaiah\*

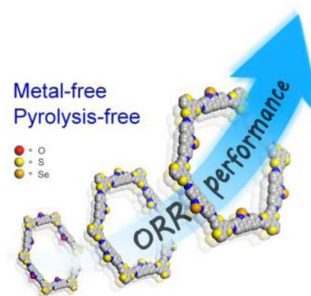


## PAPERS

18349

### Metal-free covalent organic frameworks containing precise heteroatoms for electrocatalytic oxygen reduction reaction

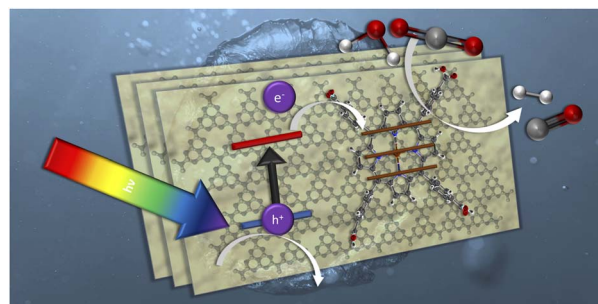
Jiali Li, Ji Jia, Jinqian Suo, Cuiyan Li, Zhiwei Wang, Hui Li,\*  
Valentin Valtchev, Shilun Qiu, Xiaoming Liu\*  
and Qianrong Fang\*



18356

### Band structure engineering of carbon nitride hybrid photocatalysts for CO<sub>2</sub> reduction in aqueous solutions

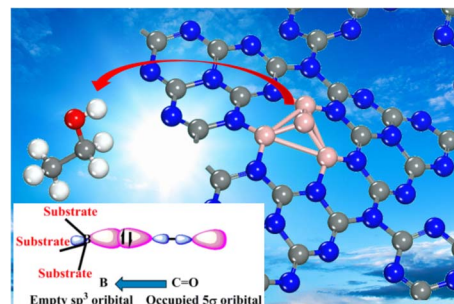
Verity L. Piercy, Gaia Neri, Troy D. Manning,  
Andrea Pugliese, Frédéric Blanc, Robert G. Palgrave,  
Alexander J. Cowan and Matthew J. Rosseinsky\*



18365

### Metal-free B<sub>4</sub>@g-C<sub>3</sub>N<sub>4</sub>: a potential electrocatalyst for highly selective and efficient conversion of CO to ethanol

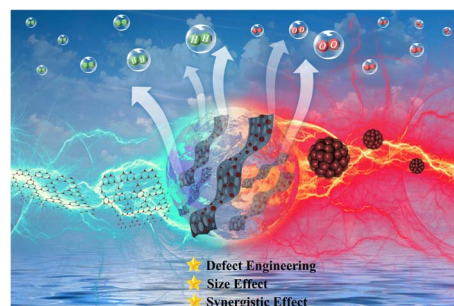
Zhichao Hao, Li-Juan Ma,\* Jianfeng Jia and Hai-Shun Wu



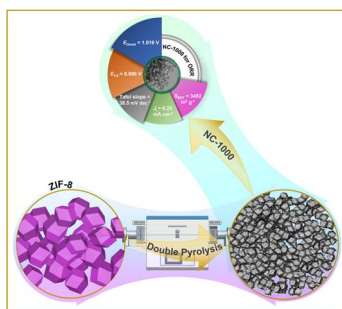
18375

### Anchoring Ru nanoclusters to defect-rich polymeric carbon nitride as a bifunctional electrocatalyst for highly efficient overall water splitting

Jiayang Zhao, Haoran Guo, Yanyan Li, Lirong Zheng,  
Hao Ren, Liyun Zhao and Rui Song\*



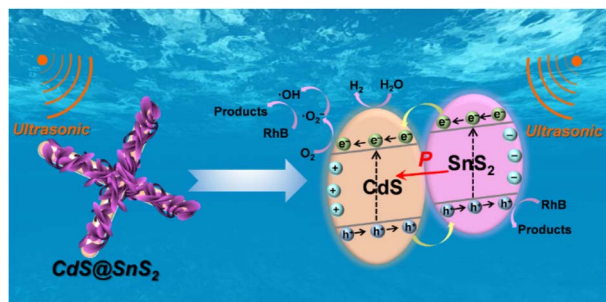
18387



### Boosting the oxygen reduction reaction using high surface area graphitic-N dominant nitrogen doped carbon

Rizwan Haider, Shengqi Ding, Wenrui Wei, Yi Wan, Yu Huang, Renhuan Li,<sup>\*</sup> Liang Wu, Ayaz Muzammil, Yi Fan and Xianxia Yuan<sup>\*</sup>

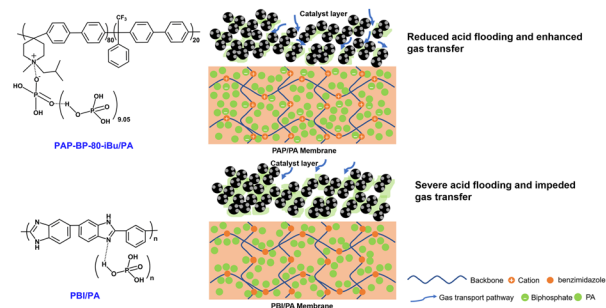
18398



### A novel 1D/2D core/shell CdS@SnS<sub>2</sub> heterostructure for efficient piezocatalytic hydrogen evolution and pollutant degradation

Renzhi Xiong, Yanjie Song, Kunjiao Li, Yanhe Xiao, Baochang Cheng and Shuijin Lei<sup>\*</sup>

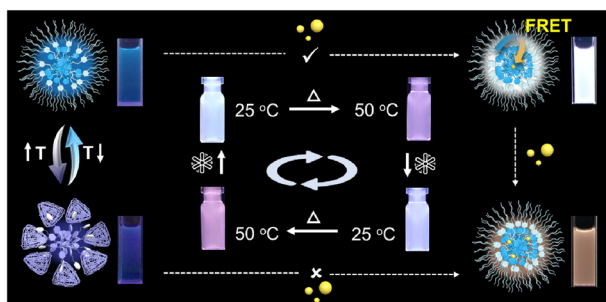
18409



### Alkyl-substituted poly(arylene piperidinium) membranes enhancing the performance of high-temperature polymer electrolyte membrane fuel cells

Jinyuan Li, Congrong Yang, Xiaoming Zhang, Zhangxun Xia, Suli Wang,<sup>\*</sup> Shansheng Yu and Gongquan Sun<sup>\*</sup>

18419



### A temperature-responsive artificial light-harvesting system in water with tunable white-light emission

Tangxin Xiao,<sup>\*</sup> Dongxing Ren, Lu Tang, Zhiying Wu, Qi Wang, Zheng-Yi Li and Xiao-Qiang Sun



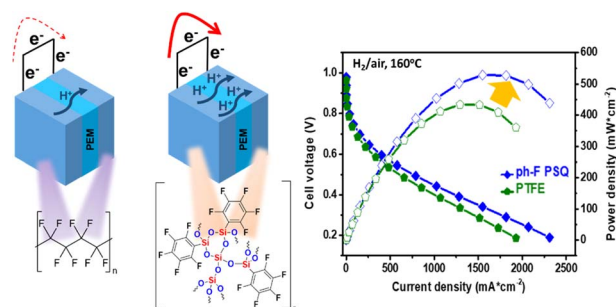


## PAPERS

18426

### Mitigating phosphoric acid migration in high temperature polymer electrolyte membrane fuel cells with hydrophobic polysilsesquioxane-based binders

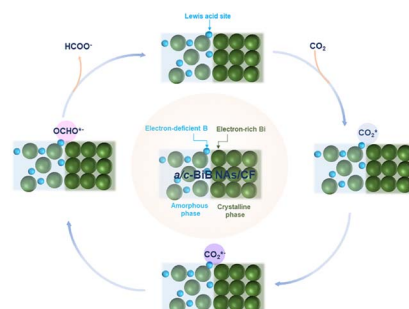
Dong-Yeop Yoo, Jiyeon Jung, Young Sang Park, Gwan Hyun Choi, Ho Gyu Yoon, Seung Sang Hwang and Albert S. Lee\*



18434

### Controlled boron incorporation tuned two-phase interfaces and Lewis acid sites in bismuth nanosheets for driving CO<sub>2</sub> electroreduction to formate

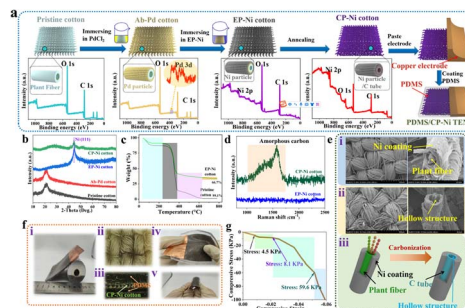
You Xu, Yiyi Guo, Youwei Sheng, Qingsong Zhou, Hongjie Yu, Kai Deng, Ziqiang Wang, Hongjing Wang\* and Liang Wang\*



18441

### Fabrication of triboelectric nanogenerators with multiple strain mechanisms for high-accuracy material and gesture recognition

Junjun Huang, Wenqing Zhang, Xin Chen, Sanlong Wang, Zhenming Chen, Peng Li,\* Honglin Li\* and Chengmei Gui\*



## CORRECTIONS

18454

### Correction: Large-scalable, ultrastable thin films for electromagnetic interference shielding

Jae Seo Park, Ji Yong Park, Kyunbae Lee, Young Shik Cho, Hyunji Shin, Yeonsu Jung, Chong Rae Park, Taehoon Kim,\* Jae Ho Kim\* and Seung Jae Yang\*



## CORRECTIONS

18455

**Correction: Constructing a rhenium complex supported on g-C<sub>3</sub>N<sub>4</sub> for efficient visible-light-driven photoreduction of CO<sub>2</sub> to CO via a novel Z-scheme heterojunction**

Phuong Ngoc Nguyen, Trang Thanh Tran, Quynh Anh Thi Nguyen, Yoshiyuki Kawazoe, S. V. Prabhakar Vattikuti, Long V. Le, Viet Quoc Bui,\* Tuan Manh Nguyen\* and Nam Nguyen Dang

