

# Journal of Materials Chemistry A

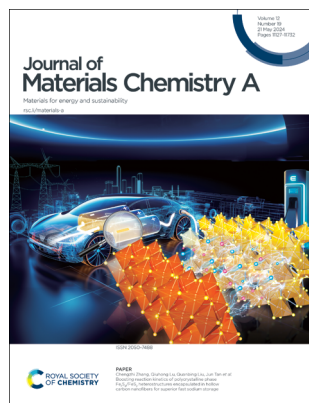
Materials for energy and sustainability

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## IN THIS ISSUE

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### Cover

See Chengzhi Zhang, Qihong Lu, Quanbing Liu, Jun Tan *et al.*, pp. 11266–11276.

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## EDITORIAL

11142

### Thriving in the modern scientific world: perspectives from early career electrochemists

Mamta Dagar, Miracle Ozioma Amechi, Jenelle Fortunato, Sonal Maroo, Taylor S. Teitsworth and Christopher P. Woodley

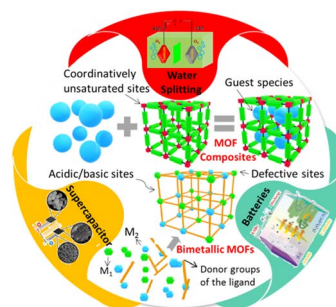


## REVIEWS

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### Structure–property–performance relationship of vanadium- and manganese-based metal–organic frameworks and their derivatives for energy storage and conversion applications

Reza Abazari,\* Soheila Sanati,\* Ashok Kumar Nanjundan, Qiyong Wang, Deepak P. Dubal and Min Liu\*



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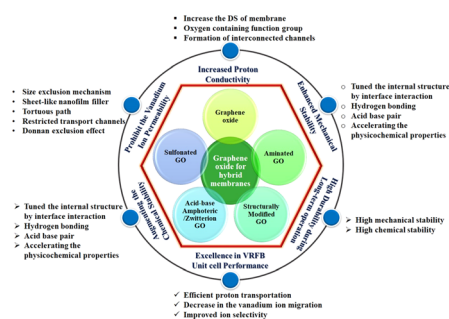


## REVIEWS

11176

## Deciphering the role of 2D graphene oxide nanofillers in polymer membranes for vanadium redox flow batteries

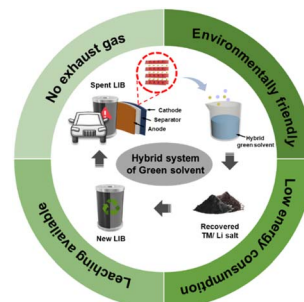
Sadhasivam Thangarasu,\* Shalu, Gowthami Palanisamy, Subramani Sadhasivam, Karuppaiah Selvakumar, Krishna Rao Eswar Neerugatti and Tae Hwan Oh\*



11235

## Green solvents in battery recycling: status and challenges

Wenyuan Qiao, Ren Zhang, Yikai Wen, Xinyi Wang, Zheng Wang, Guoqiang Tang, Minghao Liu, Hyokyeong Kang, Zafar Said,\* Jang-Yeon Hwang\* and Changhui Liu\*

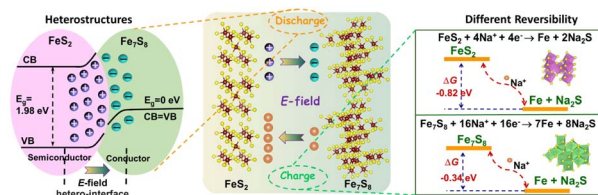


## PAPERS

11266

## Boosting reaction kinetics of polycrystalline phase Fe<sub>7</sub>S<sub>8</sub>/FeS<sub>2</sub> heterostructures encapsulated in hollow carbon nanofibers for superior fast sodium storage

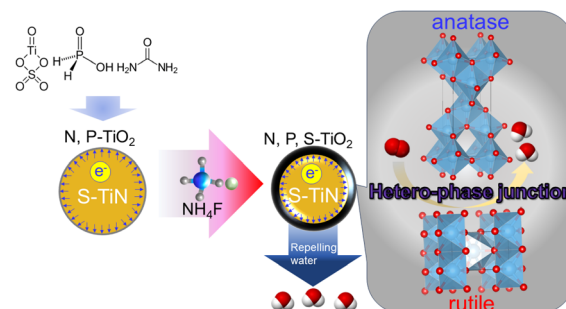
Hui Cai, Fei Wang, Huiyan Feng, Zhendong Liu, Chengzhi Zhang,\* Anbang Lu, Xia Zhao, Qihong Lu,\* Quanbing Liu\* and Jun Tan\*



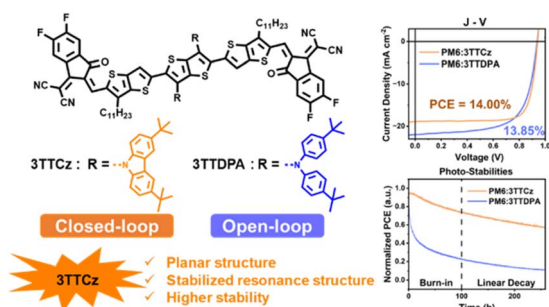
11277

## S-doped TiN supported N, P, S-tridoped TiO<sub>2</sub> with hetero-phase junctions for fuel cell startup/shutdown durability

Mitsuharu Chisaka,\* Jubair A. Shamim, Wei-Lun Hsu and Hirofumi Daiguji



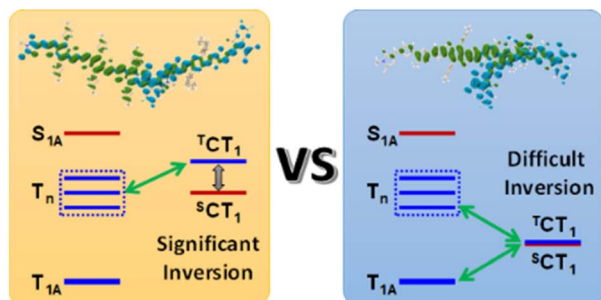
11286



### Stabilizing the resonance structure of nonfused-ring electron acceptors via a closed-loop carbazole side chain for efficient and stable organic solar cells

Ziyi Xing, Xiaoling Wu, Tianyi Chen, Shounuan Ye, Shanlu Wang, Youwen Pan, Shuixing Li,<sup>\*</sup> Minmin Shi<sup>\*</sup> and Hongzheng Chen<sup>\*</sup>

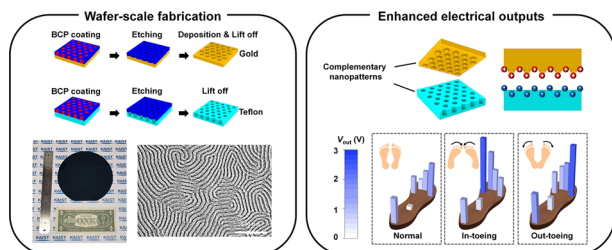
11295



### Energetic inversion of singlet/triplet interfacial charge-transfer states for reduced energy loss in organic solar cells

Xiaodan Miao, Guangchao Han<sup>\*</sup> and Yuanping Yi<sup>\*</sup>

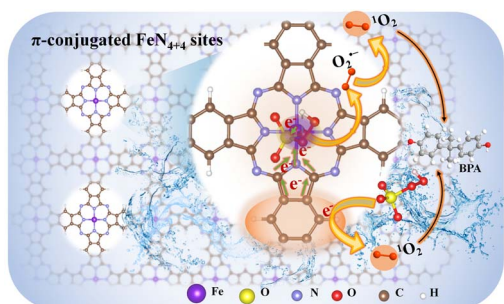
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### A triboelectric nanogenerator with synergistic complementary nanopatterns fabricated by block copolymer self-assembly

Seong-Yun Yun, Min Hyeok Kim, Geon Gug Yang, Hee Jae Choi, Do-Wan Kim, Yang-Kyu Choi<sup>\*</sup> and Sang Ouk Kim<sup>\*</sup>

11310



### Unveiling the fundamental understanding of two dimensional $\pi$ -conjugated $\text{FeN}_{4+4}$ sites for boosting peroxymonosulfate activation

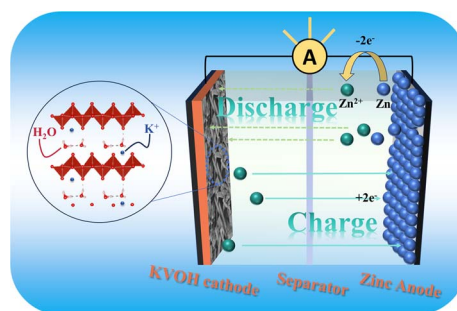
Sijia Jin, Wenxian Tan, Xiaofeng Tang, Xia Yao, Yingjian Bao, Haiyan Zhang, Shuang Song and Tao Zeng<sup>\*</sup>



11322

### Bi-intercalated vanadium pentoxide synthesized via hydrogen peroxide-induced phase transition for highly stable cathode in aqueous zinc ion batteries

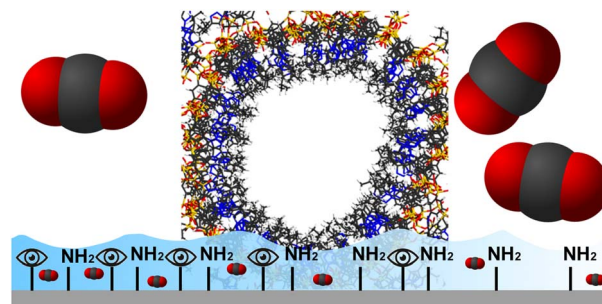
Jian-an Chen, Xuejun Hou, Xueli Wang, Chunxia Wang, Jiawei Wen,\* Yongjie Bu, Guoyong Huang,\* Tiantian Cao and Shengming Xu



11332

### Spatial tuning of adsorption enthalpies by exploiting spectator group effects in organosilica carbon capture materials

Mario Evers, Karin Hauser, Wolfgang G. Hinze, Nele Klinkenberg, Yasar Krysiak, Daniel Momers and Sebastian Polarz\*

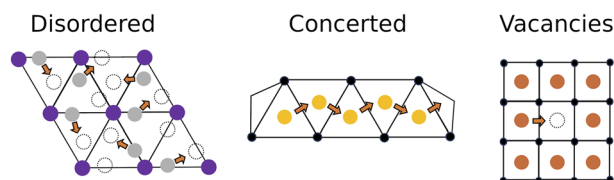


11344

### Accurate description of ion migration in solid-state ion conductors from machine-learning molecular dynamics

Takeru Miyagawa, Namita Krishnan, Manuel Grumet, Christian Reverón Baecker, Waldemar Kaiser\* and David A. Egger\*

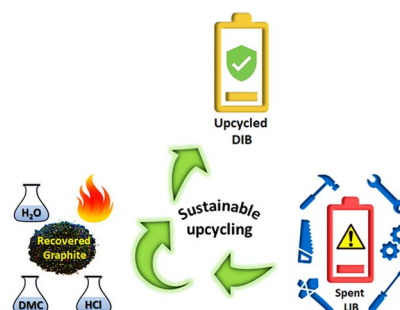
#### Machine-Learning for Ion Conductors



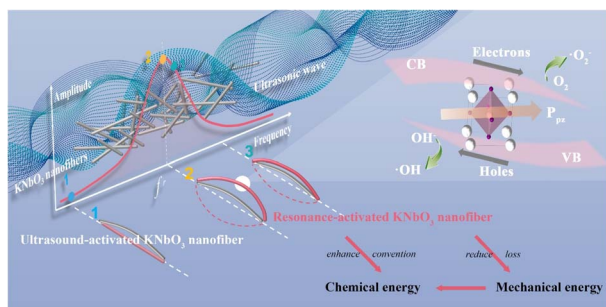
11362

### Mechanistic insights into the solvent assisted thermal regeneration of spent graphite and its upcycling into dual graphite batteries

Shuvajit Ghosh, Madhushri Bhar, Udita Bhattacharjee, Kali Prasad Yalamanchili, Satheesh Krishnamurthy and Surendra K. Martha\*



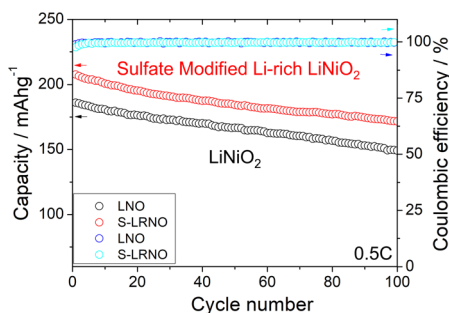
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### Resonance of $\text{KNbO}_3$ nanofibers is effectively stimulated by ultrasound with low frequency and low power to enhance piezocatalytic activity

Wanxing Zheng, Yufei Tang,\* Chaofeng Jia, Zhaowei Liu, Zhuangzhuang Zhang and Kang Zhao

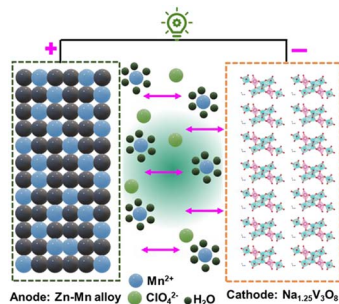
11390



### Effects of sulfate modification of stoichiometric and lithium-rich $\text{LiNiO}_2$ cathode materials

Bo Dong,\* Andrey D. Poletayev, Jonathon P. Cottom, Javier Castells-Gil, Ben F. Spencer, Cheng Li, Pengcheng Zhu, Yongxiu Chen, Jaime-Marie Price, Laura L. Driscoll, Phoebe K. Allan, Emma Kendrick, M. Saiful Islam\* and Peter R. Slater\*

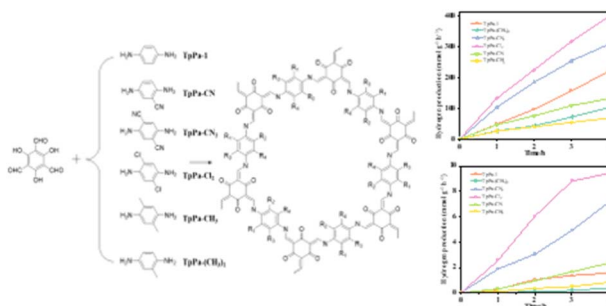
11403



### Decoding the manganese-ion storage properties of $\text{Na}_{1.25}\text{V}_3\text{O}_8$ nano-rods

Vaiyapuri Soundharrajan, Subramanian Nithiananth, Ghalib Alfaza, JunJi Piao, Duong Tung Pham, Edison Huixiang Ang, Johannes Kasnatscheew, Martin Winter, Jung Ho Kim\* and Jaekook Kim\*

11416



### Significant improvement of photocatalytic hydrogen evolution performance in covalent organic frameworks: substituent fine-tuning

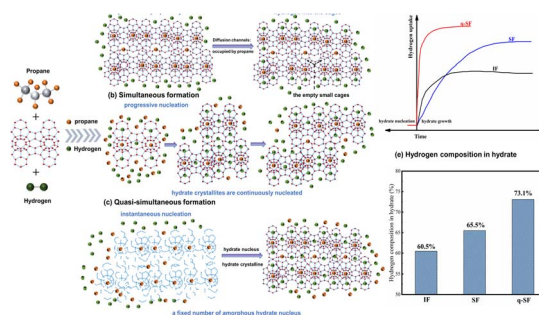
Shaodong Jiang, Hongyun Niu, Qing Sun, Rusong Zhao, Na Li and Yaqi Cai\*



11424

## An innovative nucleation method for high and rapid hydrogen storage based on clathrate hydrates

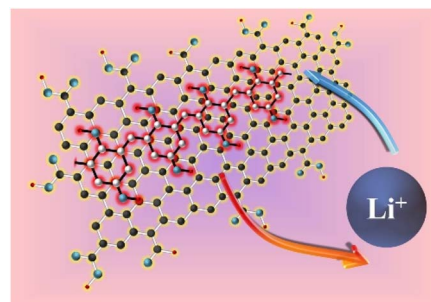
Siyuan Chen, Yanhong Wang,\* Shuanshi Fan, Xuemei Lang and Gang Li



11439

## Low-cost *p*-benzoquinone-formaldehyde polymer/reduced graphene oxide composite films as a cathode material for rechargeable lithium-ion batteries

Zhouqishuo Cai, Jinmeng Zhang, Zewen Lin, Yanan Zhao, Qianqian Yang, Xiaowen Qiu, Shumin Lin, Donghua Liu, Xiaolan Hu and Hua Bai\*



11448

## Pyrazolium ionic liquids with multiple active sites immobilized on mesoporous MCM-41 for chemical fixation of CO<sub>2</sub> under mild conditions

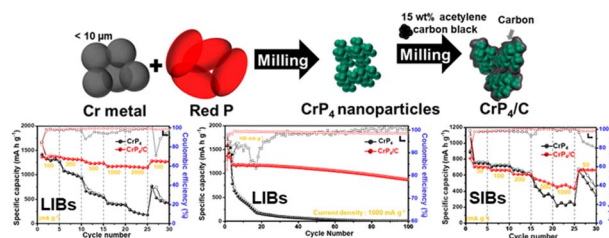
Jean Damascene Ndayambaje, Irfan Shabbir, Li Dong, Qian Su\* and Weiguo Cheng\*



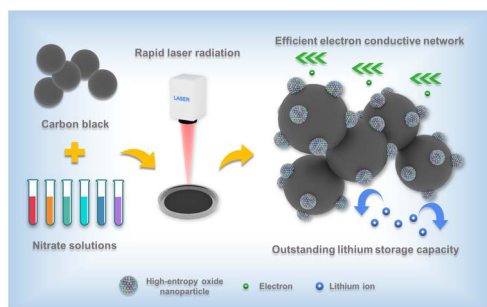
11463

## Chromium tetrphosphide (CrP<sub>4</sub>) as a high-performance anode for Li ion and Na ion batteries

Jongwon Lee, Doyeon Lee, Kyeong-Ho Kim\* and Seong-Hyeon Hong\*



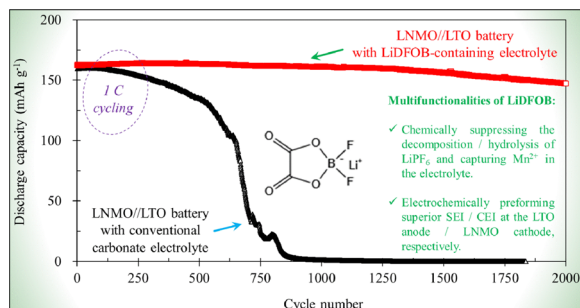
11473



### Rapid *in situ* growth of high-entropy oxide nanoparticles with reversible spinel structures for efficient Li storage

Siyu Zhu, Wei Nong, Lim Jun Ji Nicholas, Xun Cao, Peilin Zhang, Yu Lu, Mingzhen Xiu, Kang Huang, Gang Wu, Shuo-Wang Yang, Junsheng Wu, Zheng Liu, Madhavi Srinivasan,\* Kedar Hippalgaonkar\* and Yizhong Huang\*

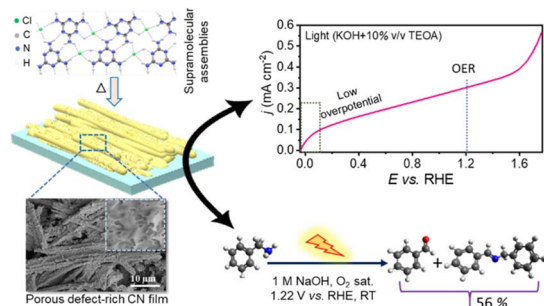
11487



### Identifying lithium difluoro(oxalate)borate as a multifunctional electrolyte additive to enable high-voltage Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> lithium-ion batteries

Ou Ka, Fang Cheng,\* Lang Wen, Xiaoqu Wang, Ting Wang, Xinyu Zeng, Wen Lu\* and Liming Dai\*

11502



### Porous carbon nitride rods as an efficient photoanode for water splitting and benzylamine oxidation

Sanjit Mondal, Gabriel Mark, Ayelet Tashakory, Michael Volokh and Menny Shalom\*

11511



### Mussel-mimetic thermal conductive films with solid–solid phase change and shape-adaptive performance

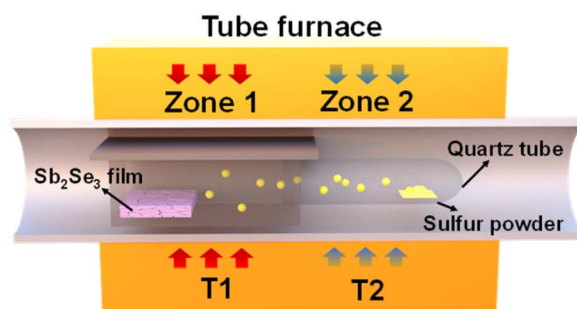
Donglei Li, Canxia Ding, Sicong Shen, Jun Wang, Limin Wu, Bo You\* and Guibao Tao\*



11524

### Crystal reconstruction and defect healing enabled high-quality $\text{Sb}_2\text{Se}_3$ films for solar cell applications

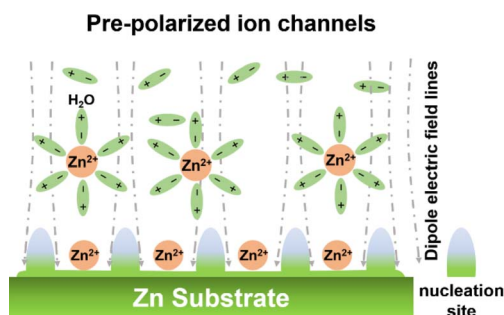
Qi Zhao, Bo Che, Haolin Wang, Xiaoqi Peng, Junjie Yang, Rongfeng Tang, Changfei Zhu and Tao Chen\*



11535

### Expediting ion migration and stabilizing interface deposition through pre-polarized ion channels for zinc-ion batteries

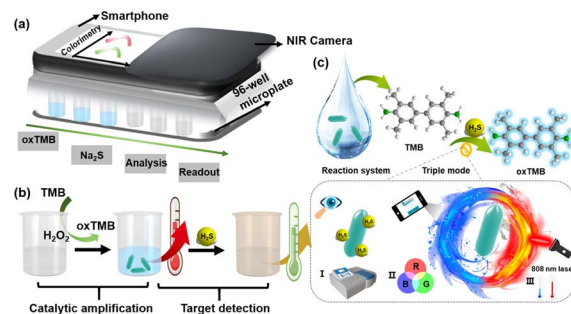
Gang Li, Fulong Hu, Jinxiu Chen, Xiaozhong Fan, Xiong Xiao, Longtao Ma\* and Long Kong\*



11544

### Engineering electronic band structure of ternary thermoelectric nanocatalysts for highly efficient detection of hydrogen sulfide

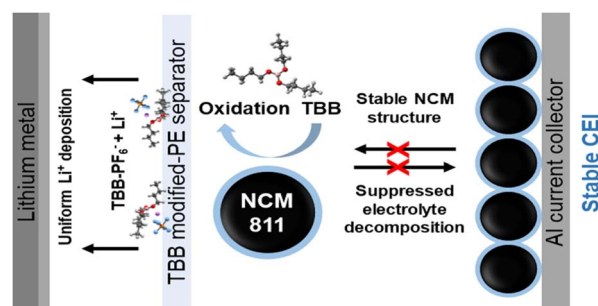
Hongyuan Shang,\* Xiaofei Zhang, Aiping Zhang,\* Jinwen Du\* and Ruiping Zhang\*



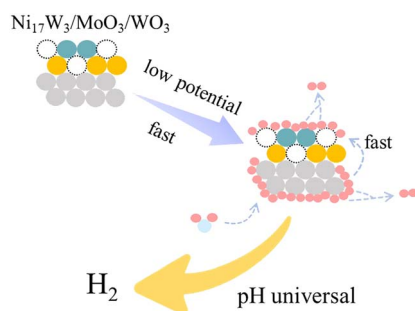
11551

### A sacrificial separator facilitating *in situ* creation of a durable CEI layer and tailoring lithium dendrites for practical lithium metal batteries

Sung Joon Park, Yun Jeong Choi, Jaemun Cheon, Hyungjun Kim, Jong-Won Lee,\* Taeun Yim\* and Ki Jae Kim\*



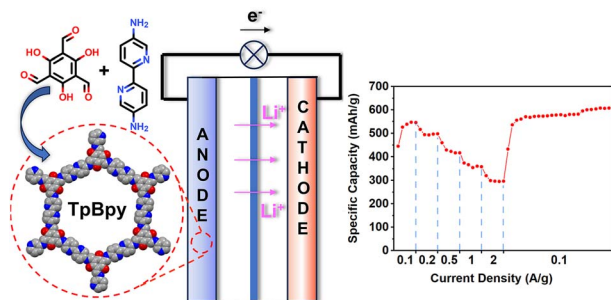
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### Oxygen vacancy-induced efficient hydrogen spillover in $\text{Ni}_{17}\text{W}_3/\text{WO}_{3-x}/\text{MoO}_{3-x}$ for a superior pH-universal hydrogen evolution reaction

Yiqing Sun, Yiwei Bao, Di Yin, Xiuming Bu,\* Yuxuan Zhang, Kaihang Yue, Xiaoshuang Qi, Ziyang Cai, Yongqiang Li, Xiulan Hu,\* Johnny C. Ho\* and Xianying Wang\*

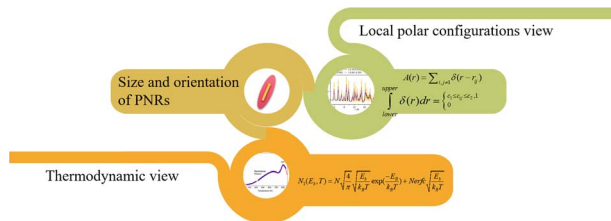
11571



### Synthesis of a pyridine-based covalent organic framework as an anode material for lithium-ion batteries

Shixi Zhong, He Zhao, Yingming Ji, Xiuhua Li, Ting Shu, Zhiming Cui and Shijun Liao\*

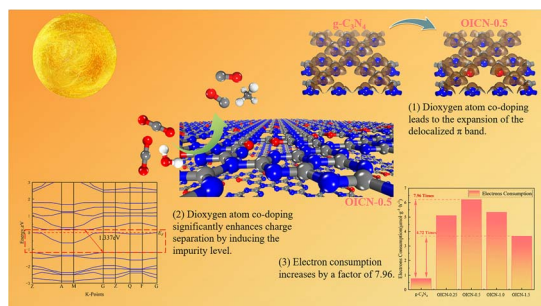
11580



### Size and orientation of polar nanoregions characterized by PDF analysis and using a statistical model in a $\text{Bi}(\text{Mg}_{1/2}\text{Ti}_{1/2})\text{O}_3\text{-PbTiO}_3$ ferroelectric re-entrant relaxor

Laijun Liu, Kaiyuan Chen, Dawei Wang, Manuel Hinterstein, Anna-Lena Hansen, Michael Knapp, Biao Lin Peng, Xianran Xing, Yuanpeng Zhang, Jing Kong, Abhijit Pramanick, Mads Ry Vogel Jørgensen and Frederick Marlton\*

11591



### Dioxygen atom co-doping $\text{g-C}_3\text{N}_4$ for boosted photoreduction activity of $\text{CO}_2$ and mechanistic investigation

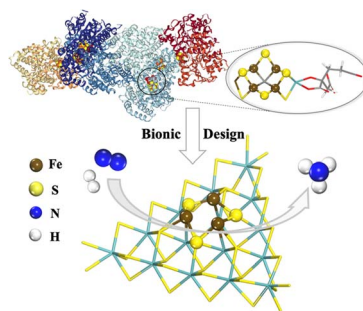
Zhang Jiang, Mingnv Guo, Zhongqing Yang, Ruiming Fang, Ziqi Wang and Jingyu Ran



11602

## A bioinspired sulfur-surrounded iron catalyst for ammonia synthesis

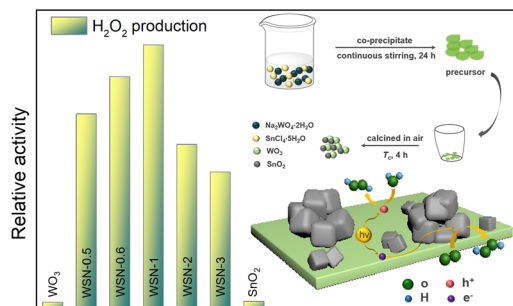
Na Zhang, Yubing Si, Qiang Fu and Xing Chen\*



11612

## A heterostructured $\text{WO}_3\text{-SnO}_2$ nanocomposite for the efficient photocatalytic production of $\text{H}_2\text{O}_2$ under visible light

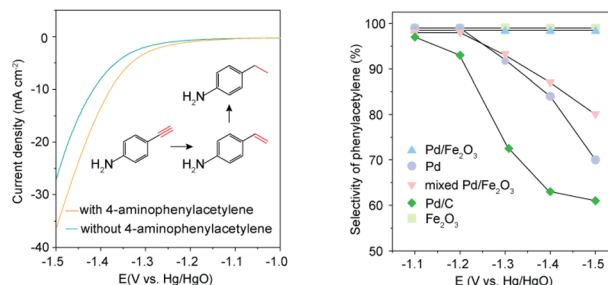
Diya Xie, Chen Chen, Yaru Wang, Cheng Sun, Yiming Xu\* and Jianguo Huang\*



11625

## Metal-support interaction triggered d-p orbital hybridization for efficient electrocatalytic semi-hydrogenation of alkynes

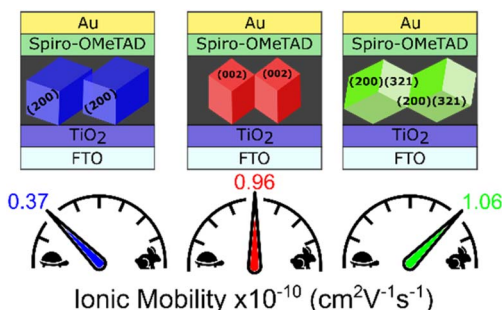
Qiong Wan, Jiaxun Zhang, Xuan Liu, Huizhi Li, Abdullah, Taotao Ren, Qiyuan Liu, Yongheng Xu, Jia Liu, Jicheng Liu, Bingqing Yao, Yiyun Fang, Xinzhe Li\* and Chi He\*



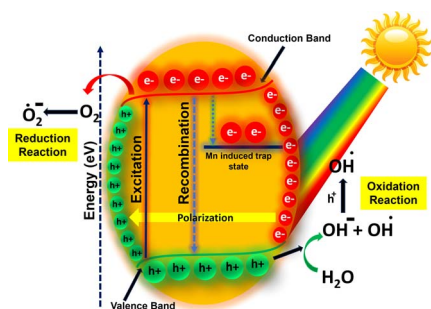
11635

## The balancing act between high electronic and low ionic transport influenced by perovskite grain boundaries

Nadja Glück, Nathan S. Hill, Marcin Giza, Eline Hutter, Irene Grill, Johannes Schlipf, Udo Bach, Peter Müller-Buschbaum, Achim Hartschuh, Thomas Bein, Tom Savenije and Pablo Docampo\*



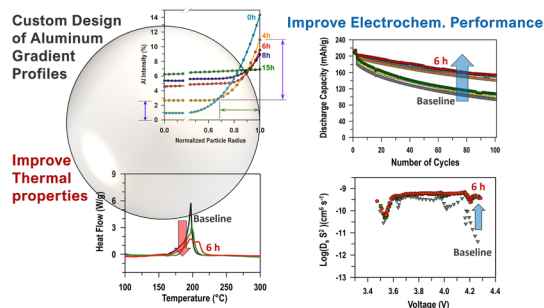
11644



### Enhanced photocatalytic activity in Mn-doped multiferroic BiFeO<sub>3</sub>

Jafar Hussain Shah, Zhi Huaqian, Rashid Mehmood, Ali Imran Channa, Jamal Kazmi, Liang Zhang, Federico Rosei\* and Zhiming Wang\*

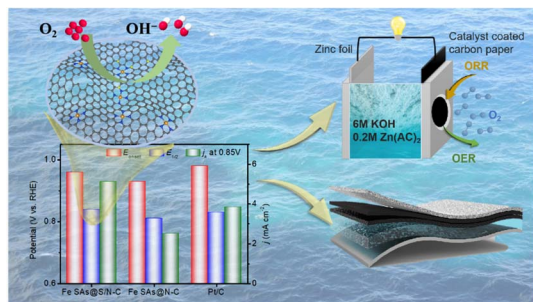
11656



### Development of diverse aluminium concentration gradient profiles in Ni-rich layered cathodes for enhanced electrochemical and thermal performances

Xinwei Jiao, Junwei Yap, Junbin Choi, Mengyuan Chen, Devendrasinh Darbar, Gongshin Qi, Xiaosong Huang\* and Jung-Hyun Kim\*

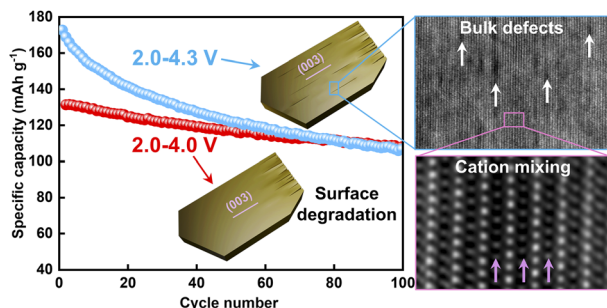
11669



### Boosting the electrocatalytic activity of single atom iron catalysts through sulfur-doping engineering for liquid and flexible rechargeable Zn–air batteries

Tianfang Yang, Bingcheng Ge, XuPo Liu, Zunjie Zhang, Ye Chen\* and Yang Liu\*

11681



### Deciphering cycling voltage-dependent failures of O<sub>3</sub>-layered cathode for sodium ion battery

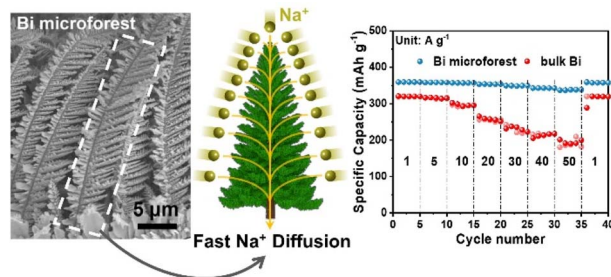
Xuejiao Zhao, Lihan Zhang, Xiaoqi Wang,\* Jinhui Li, Lin Zhang, Di Liu, Rui Yang, Xu Jin, Manling Sui and Pengfei Yan\*



11691

### Bio-inspired design of a self-supported bismuth microforest for high performance sodium storage

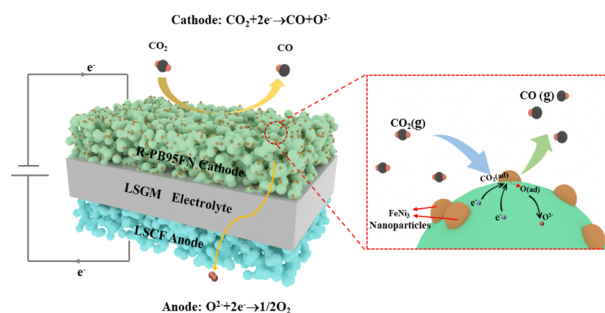
Jia Bai, Yan Liu,\* Ben Pu, Qi Tang, Yongbin Wang, Ruihan Yuan, Jin Cui, Yi Yang, Xiaojia Zheng, Bin Zhou\* and Weiqing Yang\*



11701

### In situ construction of a double perovskite heterostructure with exsolved FeNi<sub>3</sub> alloy nanoparticles for CO<sub>2</sub> electrolysis in solid oxide electrolysis cells

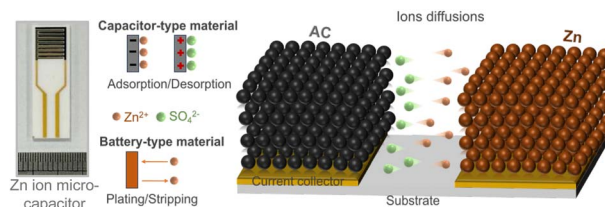
Xiaoyu Wang, Haibo Hu, Caiyue Xie, Yifei Wang, Haowei Li and Xifeng Ding\*



11710

### High-performance planar Zn-ion micro-capacitors

Yujia Fan, Xiaopeng Liu, Nibagani Naresh, Yijia Zhu, Iman Pinnock, Tianlei Wang, Mingqing Wang, Ivan P. Parkin and Buddha Deka Boruah\*



11719

### A high-current initiated formation strategy for improved cycling stability of anode-free lithium metal batteries

Kangning Cai, Mengtian Zhang, Geng Zhong, Guohuang Kang, Jie Biao, Chuang Li, Yanru Liu, Guangmin Zhou,\* Feiyu Kang\* and Yidan Cao\*

