

Energy & Environmental Science

rsc.li/ees

The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 1754-5706 CODEN EESNBY 17(7) 2359-2672 (2024)



Cover

See Marco Siniscalchi, Chris R. M. Grovenor *et al.*, pp. 2431–2440. Image reproduced by permission of Marco Siniscalchi from *Energy Environ. Sci.*, 2024, 17, 2431.



Inside cover

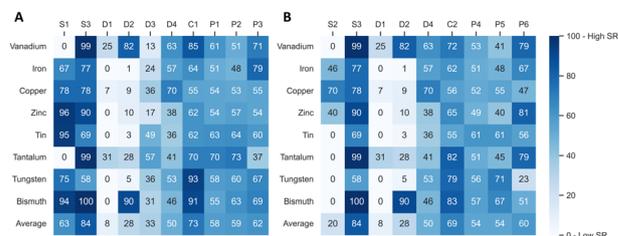
See Chen Xie, Shunpu Li, Ning Li, Yiwang Chen *et al.*, pp. 2441–2452. Image reproduced by permission of Chen Xie from *Energy Environ. Sci.*, 2024, 17, 2441.

ANALYSIS

2369

Supply risk considerations for photoelectrochemical water splitting materials

Martin Hillenbrand, Christoph Helbig* and Roland Marschall

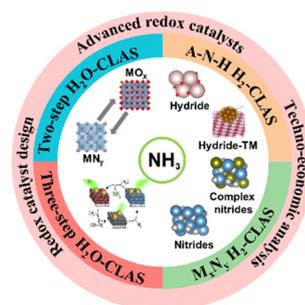


REVIEWS

2381

Towards green and efficient chemical looping ammonia synthesis: design principles and advanced redox catalysts

Xianhua Zhang, Chunlei Pei, Zhi-Jian Zhao and Jinlong Gong*



Environmental Science journals

One impactful portfolio for
every exceptional mind

Harnessing the power of interdisciplinary
science to preserve our environment



rsc.li/envsci

Fundamental questions
Elemental answers

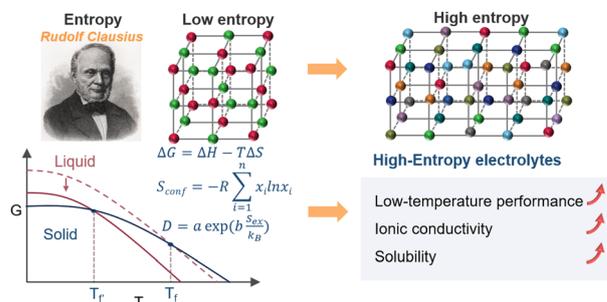


REVIEWS

2406

More is better: high-entropy electrolyte design in rechargeable batteries

Xin Zhao, Zhiqiang Fu, Xiang Zhang, Xia Wang, Baohua Li, Dong Zhou* and Feiyu Kang*

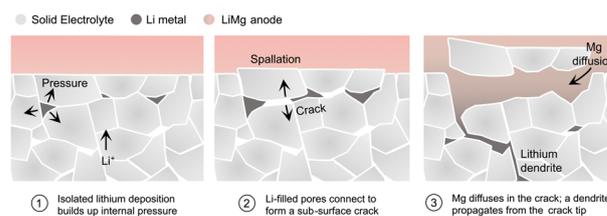


PAPERS

2431

Initiation of dendritic failure of LLZTO via sub-surface lithium deposition

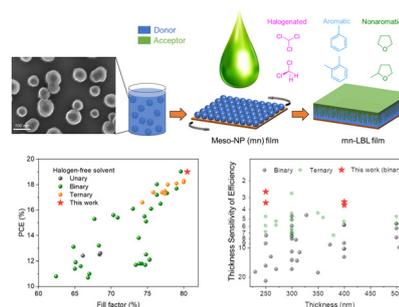
Marco Siniscalchi,* Yifu Shi, Guanchen Li, Joshua S. Gibson, Robert S. Weatherup, Ruy S. Bonilla, Susannah C. Speller and Chris R. M. Groveror*



2441

Water-based layer-by-layer processing enables 19% efficient binary organic solar cells with minimized thickness sensitivity

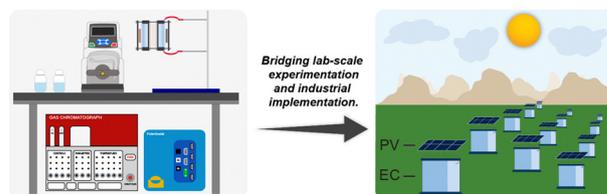
Chen Xie,* Xianghui Zeng, Chengsheng Li, Xiaokang Sun, Songqiang Liang, Hui Huang, Baoshen Deng, Xuanlin Wen, Guangye Zhang, Peng You, Chuqun Yang, Yulai Han, Shunpu Li,* Guanghao Lu, Hanlin Hu, Ning Li* and Yiwang Chen*



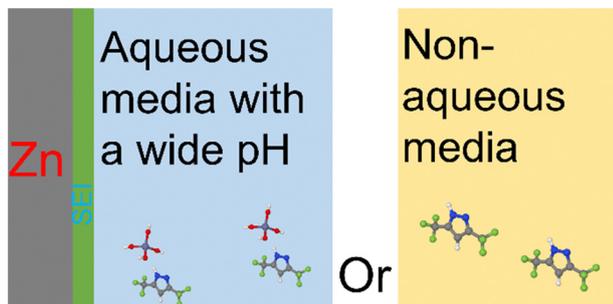
2453

Modeling diurnal and annual ethylene generation from solar-driven electrochemical CO₂ reduction devices

Kyra M. K. Yap, William J. Wei, Melanie Rodríguez Pabón, Alex J. King, Justin C. Bui, Lingze Wei, Sang-Won Lee, Adam Z. Weber,* Alexis T. Bell,* Adam C. Nielander* and Thomas F. Jaramillo*



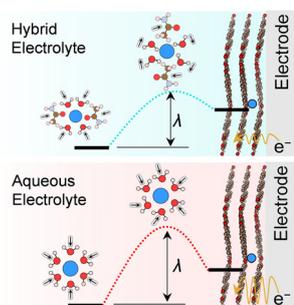
2468



Engineering a zinc anode interphasial chemistry for acidic, alkaline and non-aqueous electrolytes

Lin Ma,* Travis P. Pollard, Marshall A. Schroeder,* Chao Luo, Ye Zhang, Glenn Pastel, Longsheng Cao, Jiaxun Zhang, Vadim Shipitsyn, Yan Yao, Chunsheng Wang, Oleg Borodin* and Kang Xu*

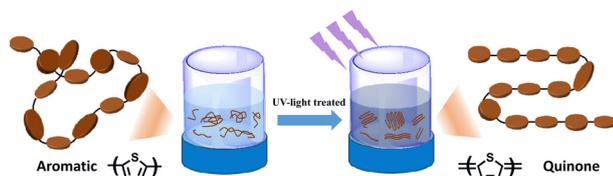
2480



An ultrafast Na-ion battery chemistry through coupling sustainable organic electrodes with modulated aqueous electrolytes

Yunpei Zhu, Xianrong Guo, Simil Thomas, Jian Yin, Youyou Yuan, Zhengnan Tian, George T. Harrison, Stefaan De Wolf, Osman M. Bakr, Omar F. Mohammed and Husam N. Alshareef*

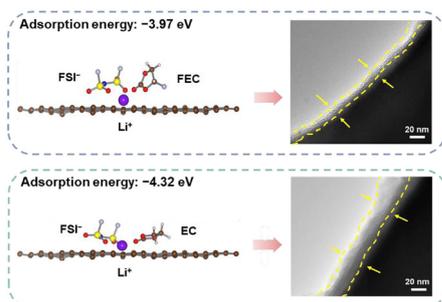
2492



Light-induced quinone conformation of polymer donors toward 19.9% efficiency organic solar cells

Chuanhang Guo, Yuandong Sun, Liang Wang, Chenhao Liu, Chen Chen, Jingchao Cheng, Weiyi Xia, Zirui Gan, Jing Zhou, Zhenghong Chen, Jinpeng Zhou, Dan Liu, Jingxing Guo, Wei Li and Tao Wang*

2500



Unveiling the adsorption tendency of film-forming additives to enable fast-charging hard carbon anodes with regulated Li plating

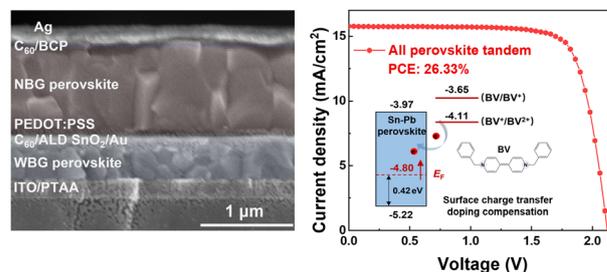
Yongteng Dong, Yuanmao Chen, Xinyang Yue* and Zheng Liang*



2512

Surface charge transfer doping of narrow-bandgap Sn–Pb perovskites for high-performance tandem solar cells

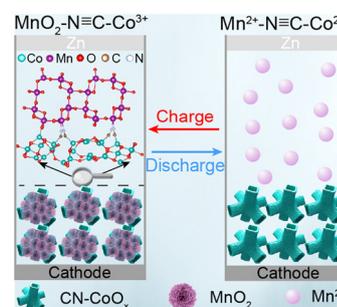
Qiang Sun, Zhiguo Zhang, Haixuan Yu, Junyi Huang, Xiongjie Li, Letian Dai, Qi Wang, Yan Shen* and Mingkui Wang*



2521

A cyano cobalt “electron transfer bridge” boosting the two-electron reaction of a MnO₂ cathode with long lifespan in aqueous zinc batteries

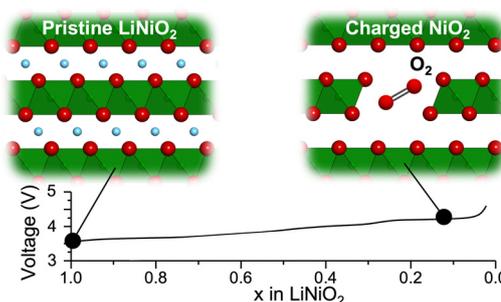
Yaozhi Liu, Lu Lin, Tengsheng Zhang, Zhiqing Xue, Jie Liu, Dongliang Chao* and Xiaoqi Sun*



2530

Does trapped O₂ form in the bulk of LiNiO₂ during charging?

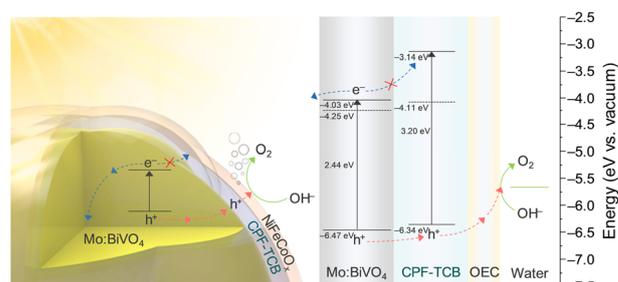
Mikkel Juelsholt, Jun Chen, Miguel A. Pérez-Osorio, Gregory J. Rees, Sofia De Sousa Coutinho, Helen E. Maynard-Casely, Jue Liu, Michelle Everett, Stefano Agrestini, Mirian Garcia-Fernandez, Ke-Jin Zhou, Robert A. House* and Peter G. Bruce*



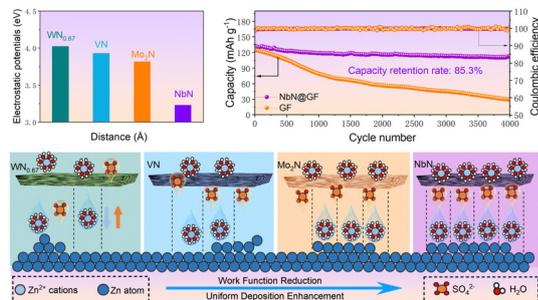
2541

High-efficiency unbiased water splitting with photoanodes harnessing polycarbazole hole transport layers

Jin Wook Yang, Su Geun Ji, Chang-Seop Jeong, Jaehyun Kim, Hee Ryeong Kwon, Tae Hyung Lee, Sol A Lee, Woo Seok Cheon, Seokju Lee, Hyungsoo Lee, Min Sang Kwon, Jooho Moon,* Jin Young Kim* and Ho Won Jang*



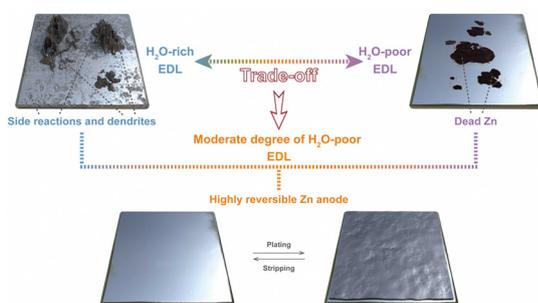
2554



Redistributing zinc-ion flux by work function chemistry toward stabilized and durable Zn metal batteries

Qiang Hu, Jisong Hu, Fei Ma, Yunbo Liu, Lincai Xu, Lei Li, Songtao Zhang, Xingquan Liu,* Jingxin Zhao* and Huan Pang*

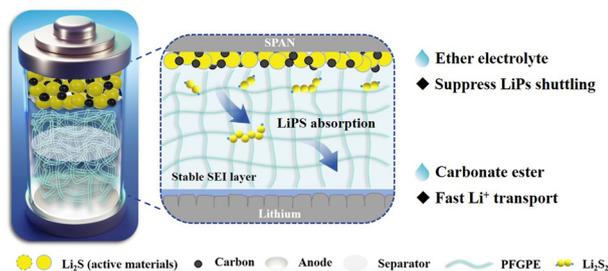
2566



Trade-off between H₂O-rich and H₂O-poor electric double layers enables highly reversible Zn anodes in aqueous Zn-ion batteries

Kaiwen Qi, Pengrui Liang, Shiqiang Wei, Huaisheng Ao, Xuan Ding, Shiyuan Chen, Zhechen Fan, Chengming Wang, Li Song, Xiaojun Wu,* Changzheng Wu* and Yongchun Zhu*

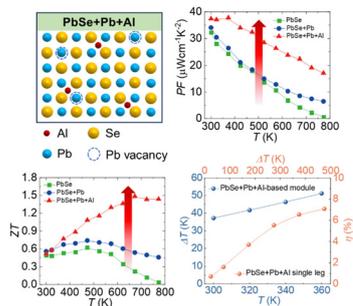
2576



Tailoring a multi-system adaptable gel polymer electrolyte for the realization of carbonate ester and ether-based Li-SPAN batteries

Yan Zhang, Zhaokun Wang, Yanrui Pan, Hao Yu, Zuohang Li, Chen Li, Su Wang, Yue Ma,* Xixi Shi, Hongzhou Zhang, Dawei Song and Lianqi Zhang*

2588



Realizing high-performance thermoelectric modules through enhancing the power factor via optimizing the carrier mobility in n-type PbSe crystals

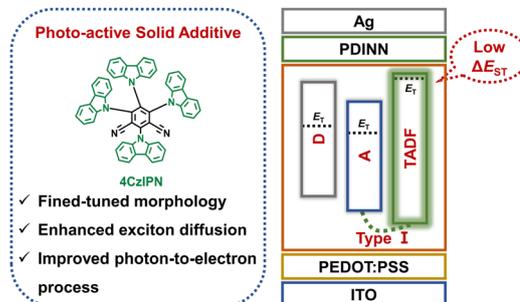
Siqi Wang, Yi Wen, Shulin Bai, Zhe Zhao, Yichen Li, Xiang Gao, Qian Cao, Cheng Chang* and Li-Dong Zhao*



2598

Synergistically optimizing the optoelectronic properties and morphology using a photo-active solid additive for high-performance binary organic photovoltaics

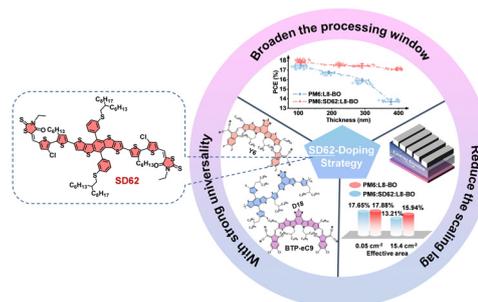
Mengting Wang, Tianyi Chen, Yaokai Li, Guanyu Ding, Zeng Chen, Jikun Li, Chang Xu, Adiljan Wupur, Chenran Xu, Yuang Fu, Jingwei Xue, Weifei Fu, Weiming Qiu, Xi Yang, Dawei Wang, Wei Ma, Xinhui Lu, Haiming Zhu, Xiankai Chen, Xiaoye Wang, Hongzheng Chen* and Lijian Zuo*



2610

Designing dithieno-benzodithiophene-based small molecule donors for thickness-tolerant and large-scale polymer solar cells

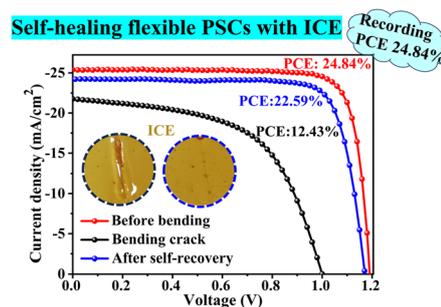
Shanshan Wang, Lin-Yong Xu, Bo Xiao, Mingxia Chen, Meimei Zhang, Wei Gao, Biao Xiao, Alex K.-Y. Jen, Renqiang Yang, Jie Min* and Rui Sun*



2621

Self-healing ion-conducting elastomer towards record efficient flexible perovskite solar cells with excellent recoverable mechanical stability

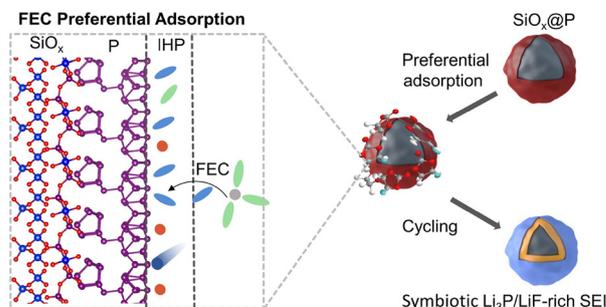
Tangyue Xue, Baojin Fan, Ke-Jian Jiang, Qiang Guo, Xiaotian Hu,* Meng Su, Erjun Zhou* and Yanlin Song*



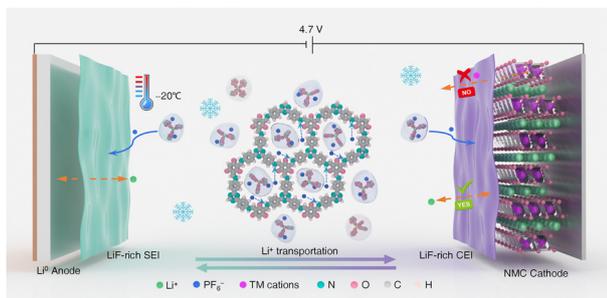
2631

Material–electrolyte interfacial interaction enabling the formation of an inorganic-rich solid electrolyte interphase for fast-charging Si-based lithium-ion batteries

Kai Cheng, Shuibin Tu, Bao Zhang, Wenyu Wang, Xiaohong Wang, Yucheng Tan, Xiaoxue Chen, Chunhao Li, Chenhui Li, Li Wang and Yongming Sun*



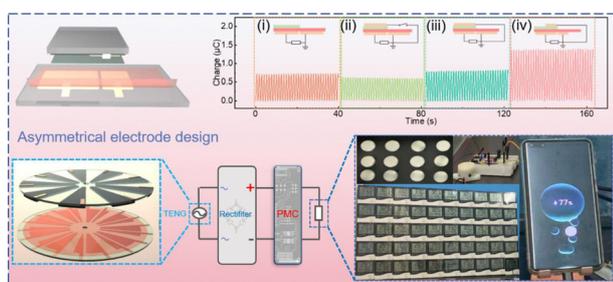
2642



A microscopically heterogeneous colloid electrolyte of covalent organic nanosheets for ultrahigh-voltage and low-temperature lithium metal batteries

Weifeng Zhang, Guoxing Jiang, Wenwu Zou, Xilong Chen, Siyuan Peng, Shengguang Qi, Renzong Hu, Huiyu Song, Zhiming Cui, Li Du* and Zhenxing Liang*

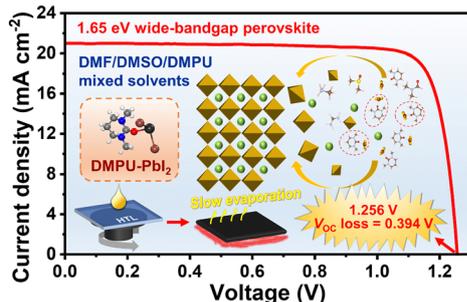
2651



Ultra-stability and high output performance of a sliding mode triboelectric nanogenerator achieved by an asymmetric electrode structure design

Gui Li, Jian Wang, Yue He, Shuyan Xu, Shaoke Fu, Chuncai Shan, Huiyuan Wu, Shanshan An, Kaixian Li, Wen Li, Ping Wang* and Chenguo Hu*

2662



Custom-tailored solvent engineering for efficient wide-bandgap perovskite solar cells with a wide processing window and low V_{oc} losses

Ruohao Wang, Jingwei Zhu, Jiayu You, Hao Huang, Yang Yang, Ruihao Chen, Juncheng Wang, Yuliang Xu, Zhiyu Gao, Jiayue Chen, Bangxin Xu, Bing Wang, Cong Chen,* Dewei Zhao* and Wen-Hua Zhang*

