

Materials Horizons

rsc.li/materials-horizons

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 2051-6347 CODEN MHAOAL 11(18) 4227-4522 (2024)



Cover

See Moin Khwaja and Takuya Harada, pp. 4311–4320. Image reproduced by permission of Moin Khwaja from *Mater. Horiz.*, 2024, 11, 4311.



Inside cover

See Bhagya Dharmasiri, Luke C. Henderson *et al.*, pp. 4321–4328. Image reproduced by permission of Luke Henderson from *Mater. Horiz.*, 2024, 11, 4321.

EDITORIAL

4237

Materials Horizons Emerging Investigator Series: Dr Bhagya Dharmasiri, Deakin University, Australia

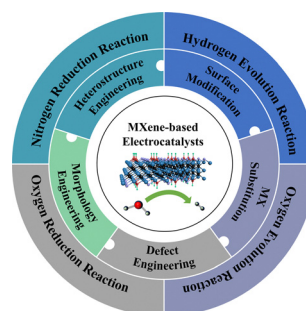


REVIEWS

4239

Advances and challenges in MXene-based electrocatalysts: unlocking the potential for sustainable energy conversion

Lei He, Haizheng Zhuang, Qi Fan, Ping Yu, Shengchao Wang, Yifan Pang, Ke Chen and Kun Liang*



**GOLD
OPEN
ACCESS**

EES Batteries

**Exceptional research on
batteries and energy storage**

Part of the EES family



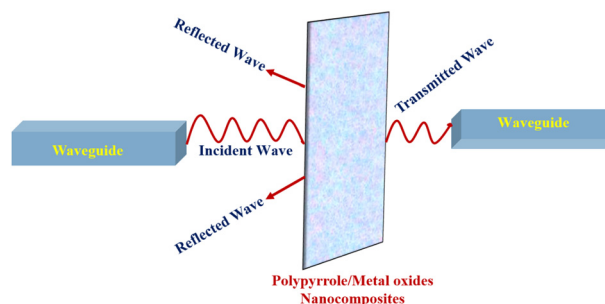
**Join
in** | Publish with us
rsc.li/EESBatteries

REVIEWS

4256

Exploring the efficacy and future potential of polypyrrole/metal oxide nanocomposites for electromagnetic interference shielding: a review

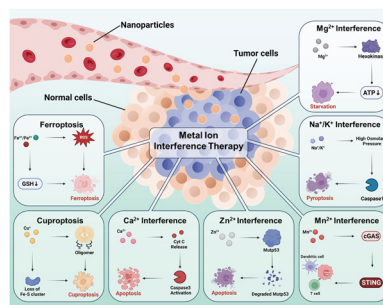
Yuvika Sood, Harish Mudila, Pankaj Chamoli, Parveen Saini* and Anil Kumar*



4275

Metal ion interference therapy: metal-based nanomaterial-mediated mechanisms and strategies to boost intracellular "ion overload" for cancer treatment

Yutang Li, Yandong Wang, Li Zhao, Martina H. Stenzel* and Yanyan Jiang*

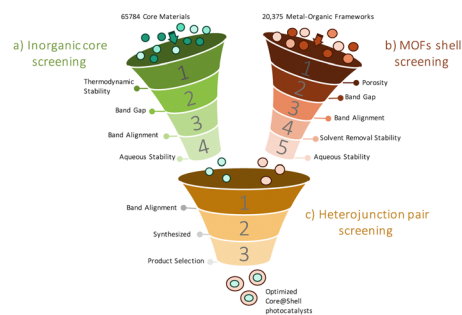


COMMUNICATIONS

4311

High-throughput screening of nano-hybrid metal-organic-frameworks for photocatalytic CO₂ reduction

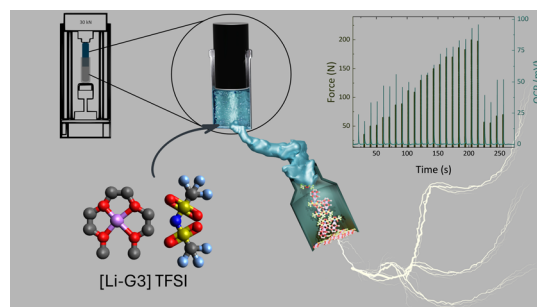
Moin Khwaja and Takuya Harada*



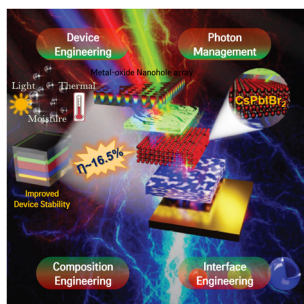
4321

From stress to charge: investigating the piezoelectric response of solvate ionic liquid in structural energy storage composites

Žan Simon, Bhagya Dharmasiri,* Timothy Harte, Peter C. Sherrell and Luke C. Henderson*



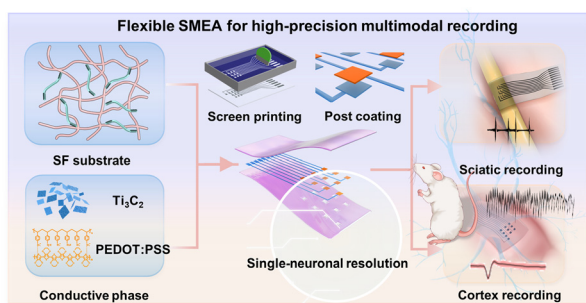
4329



Revealing the full potential of CsPbI₂Br₂ perovskite solar cells: advancements towards enhanced performance

Mohammad Ismail Hossain,* Md. Shahiduzzaman,* Junayed Hossain Rafij, Asman Tamang, Md. Akhtaruzzaman, Almohamadi Hamad, Jamal Uddin, Nowshad Amin, Jean-Michel Nunzi and Tetsuya Taima

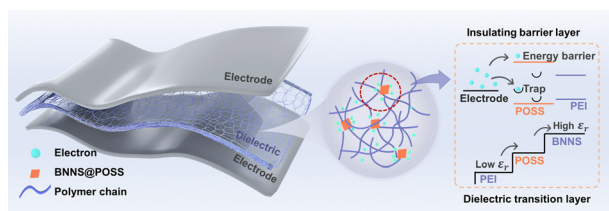
4338



Flexible silk-fibroin-based microelectrode arrays for high-resolution neural recording

Jie Ding, Mingze Zeng, Yuan Tian, Zhihong Chen, Zi Qiao, Zhanwen Xiao, Chengheng Wu, Dan Wei,* Jing Sun and Hongsong Fan*

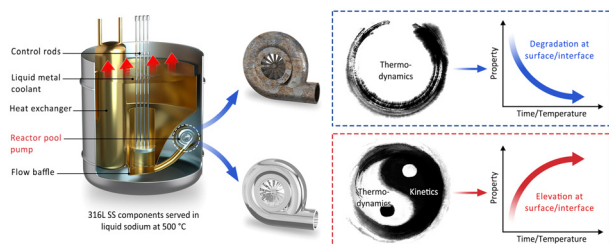
4348



Enhancing the high-temperature energy storage properties of PEI dielectrics by constructing trap-rich covalently cross-linked networks via POSS-functionalized BNNs

Yijie Zhou, Zongwu Zhang, Qiufan Tang, Xiaoyan Ma* and Xiao Hou

4359



A self-organized sandwich structure of chromium nitride for ultra-long lifetime in liquid sodium

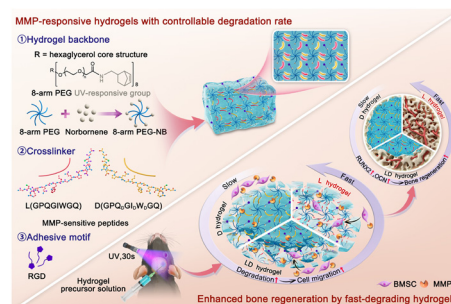
Ming Lou, Ran Chen, Kai Xu, Jibin Pu* and Keke Chang*



4367

Injectable hydrogels for bone regeneration with tunable degradability *via* peptide chirality modification

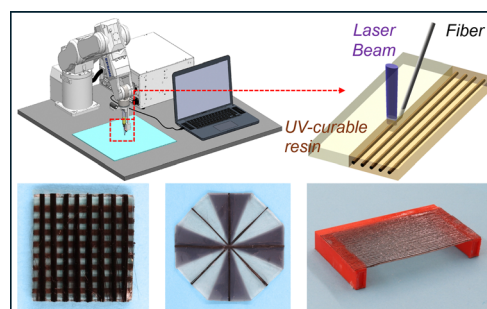
Weikai Chen, Shihao Sheng, Kai Tan, Sicheng Wang, Xiang Wu, Jiayi Yang, Yan Hu, Liehu Cao, Ke Xu, Fengjin Zhou,* Jiacan Su,* Qin Zhang* and Lei Yang*



4378

Embedded 3D printing of UV-curable thermosetting composites with continuous fiber

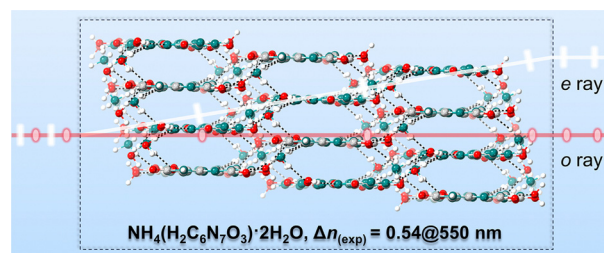
Yuchen Ding, Alston X. Gracego, Yuanrui Wang, Guoying Dong, Martin L. Dunn* and Kai Yu*



4393

A highly birefringent metal-free crystal assembled by cooperative non-covalent interactions

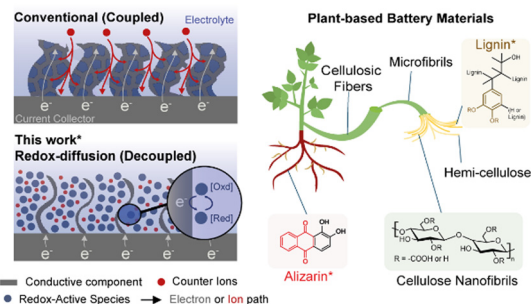
Yanqiang Li, Yang Zhou, Belal Ahmed, Qianting Xu, Weiqi Huang, Yipeng Song, Xianyu Song, Bin Chen, Junhua Luo and Sangen Zhao*



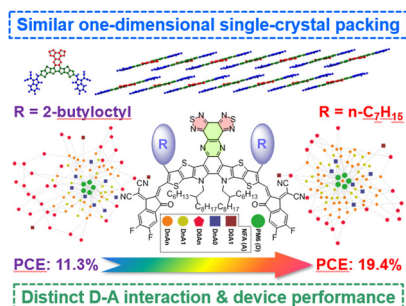
4400

Stretchable and biodegradable plant-based redox-diffusion batteries

Aiman Rahmanudin,* Mohsen Mohammadi, Patrik Isacson, Yuyang Li, Laura Seufert, Nara Kim, Saeed Mardi, Isak Engquist, Reverant Crispin and Klas Tybrandt*



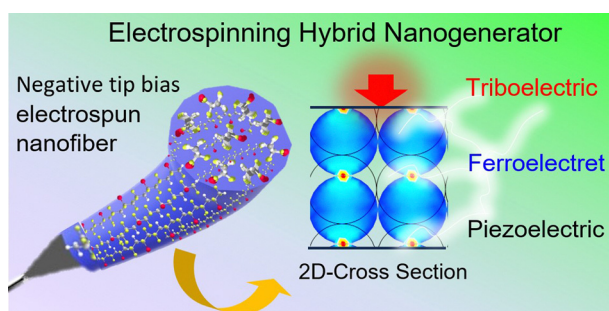
4413



The anti-correlation effect of alkyl chain size on the photovoltaic performance of centrally extended non-fullerene acceptors

Tainan Duan, Jia Wang, Xiaochan Zuo, Xingqi Bi, Cheng Zhong,* Yulu Li, Yuhong Long, Kaihui Tu, Weichao Zhang, Ke Yang, Huiqiong Zhou, Xiangjian Wan, Yan Zhao,* Bin Kan* and Yongsheng Chen*

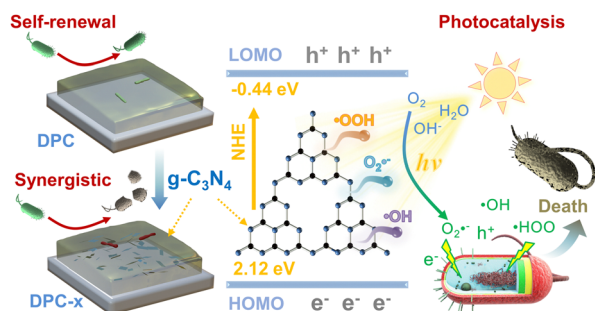
4424



Electrospun polarity-controlled molecular orientation for synergistic performance of an artifact-free piezoelectric anisotropic sensor

Ajay Kumar, Varun Gupta, Pinki Malik, Shanker Ram and Dipankar Mandal*

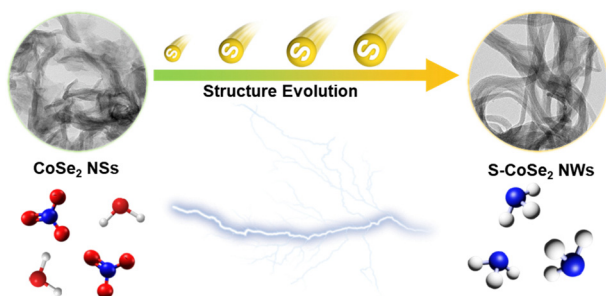
4438



Designing a photocatalytic and self-renewed g-C₃N₄ nanosheet/poly-Schiff base composite coating towards long-term biofouling resistance

Saijun Wu, Minglong Yan,* Yinghao Wu, Yangmin Wu, Xijian Lan, Jianjun Cheng and Wenjie Zhao*

4454



Sulfur-regulated CoSe₂ nanowires with high-charge active centers for electrochemical nitrate reduction to ammonium

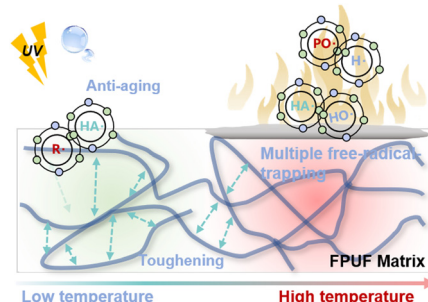
Wuyong Zhang, Yingjie Wen, Haocheng Chen, Minli Wang, Caihan Zhu, Yunan Wang* and Zhiyi Lu*



4462

Multiple free-radical-trapping and hydrogen-bonding-enhanced polyurethane foams with long-lasting flame retardancy, aging resistance, and toughness

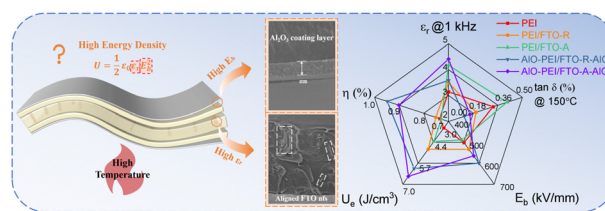
Lei He, Ming-Jun Chen,* Fu-Rong Zeng, Ting Wang, Wei-Luo, Dan-Xuan Fang, Shuai-Qi Guo, Cong Deng, Hai-Bo Zhao* and Yu-Zhong Wang*



4472

Magnetic-assisted alignment of nanofibers in a polymer nanocomposite for high-temperature capacitive energy storage applications

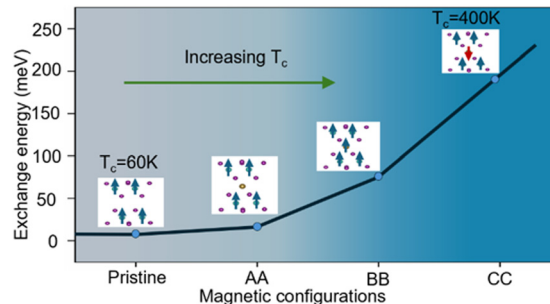
Zhi Li, Jian Wang, Junjie Zou, Shuxuan Li, Xin Zhen, Zhonghui Shen, Baowen Li, Xin Zhang* and Ce-Wen Nan*



4482

Enhancement of interlayer exchange coupling via intercalation in 2D magnetic bilayers: towards high Curie temperature

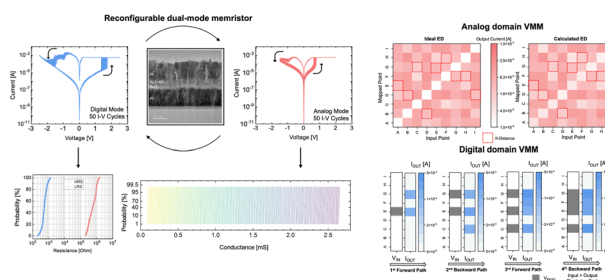
Suman Mishra, In Kee Park, Saqib Javaid, Seung Hwan Shin* and Geunsiik Lee*



4493

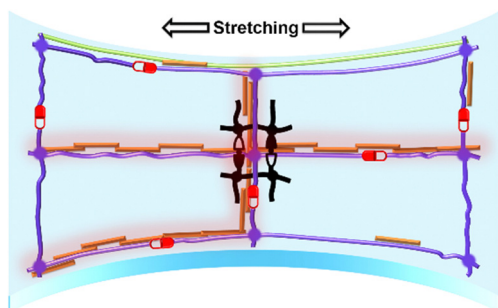
Heterogeneous density-based clustering with a dual-functional memristive array

Dong Hoon Shin, Sunwoo Cheong, Soo Hyung Lee, Yoon Ho Jang, Taegyun Park, Janguk Han, Sung Keun Shim, Yeong Rok Kim, Joon-Kyu Han, In Kyung Baek, Néstor Ghenzi* and Cheol Seong Hwang*



COMMUNICATIONS

4507

**Highly flexible yet strain-insensitive conjugated polymer**

Wen Wen Deng, Ze Ping Zhang,* Min Zhi Rong* and Ming Qiu Zhang*

CORRECTION

4519

Correction: High-performance one-dimensional halide perovskite crossbar memristors and synapses for neuromorphic computing

Sujaya Kumar Vishwanath,* Benny Febriansyah, Si En Ng, Tisita Das, Jyotibdha Acharya, Rohit Abraham John, Divyam Sharma, Putu Andhita Dananjaya, Metikoti Jagadeeswararao, Naveen Tiwari, Mohit Ramesh Chandra Kulkarni, Wen Siang Lew, Sudip Chakraborty,* Arindam Basu and Nripan Mathews*

