

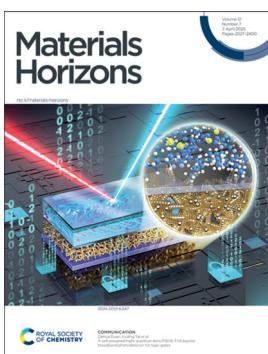
# Materials Horizons

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.

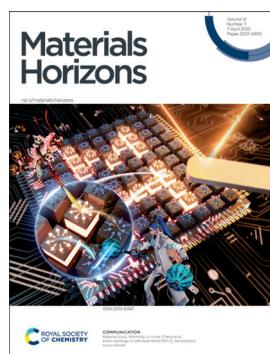
## IN THIS ISSUE

ISSN 2051-6347 CODEN MHAOAL 12(7) 2027–2400 (2025)



### Cover

See Zaihua Duan,  
Huiling Tai et al.,  
pp. 2179–2186.  
Image reproduced  
by permission of  
Zaihua Duan from  
*Mater. Horiz.*,  
2025, 12, 2179.



### Inside cover

See Kepeng Song,  
Weiming Lv, Limei Zheng  
et al., pp. 2187–2196.  
Image reproduced  
by permission of  
Kepeng Song from  
*Mater. Horiz.*,  
2025, 12, 2187.

## EDITORIALS

2038

**Materials Horizons Emerging Investigator Series:**  
Dr Dibyajyoti Ghosh and Dr Satyaprasad  
P. Senanayak, Indian Institute of Technology,  
Delhi and National Institute of Science  
Education and Research, India



2040

**Emerging horizons in polymer applications**

Calum T. J. Ferguson and Kostas Parkatzidis



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](http://rsc.li/EESBatteries)

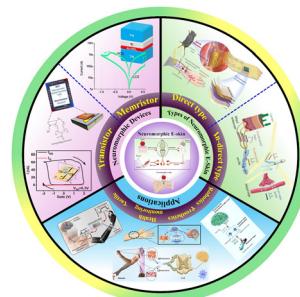


## REVIEWS

2045

**Neuromorphic devices for electronic skin applications**

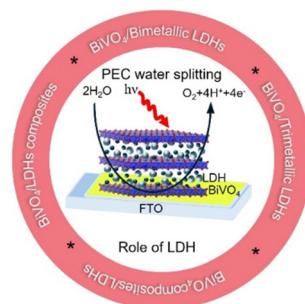
Chandrashekhar S. Patil, Sourabh B. Ghode, Jungmin Kim, Girish U. Kamble, Somnath S. Kundale, Abdul Mannan, Youngbin Ko, Muhammad Noman, Qazi Muhammad Saqib, Swapnil R. Patil, Seo Yeong Bae, Jin Hyeok Kim, Jun Hong Park and Jinho Bae\*



2089

**Layered double hydroxide modified bismuth vanadate as an efficient photoanode for enhancing photoelectrochemical water splitting**

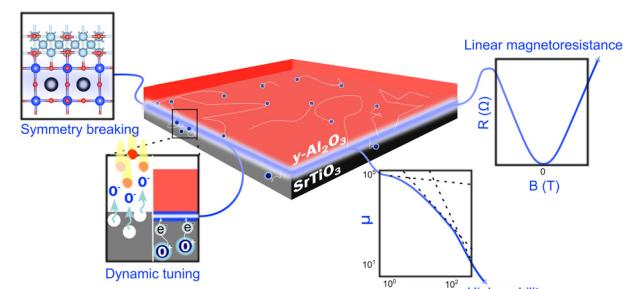
Md. Masum Billah and Go Kawamura\*



2119

**Unearthing the emerging properties at buried oxide heterointerfaces: the  $\gamma\text{-Al}_2\text{O}_3/\text{SrTiO}_3$  heterostructure**

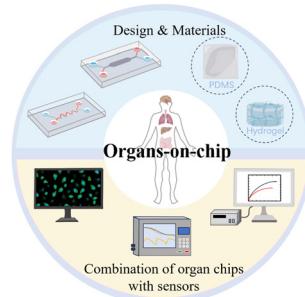
Tristan Sebastiaan Steegemans\* and Dennis Valbjørn Christensen\*



2161

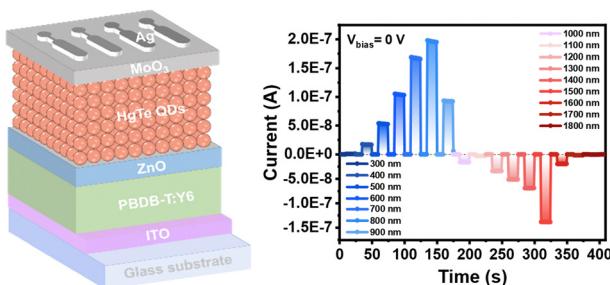
**Sensor-combined organ-on-a-chip for pharmaceutical and medical sciences: from design and materials to typical biomedical applications**

Yumeng Liao, Danni Chai, Quan Wang, Xueqi Wang, Qian Yong, Zhaoming Cheng, Chuanjun Zhang, Di Zhang, Boshi Liu,\* Rui Liu\* and Zheng Li\*



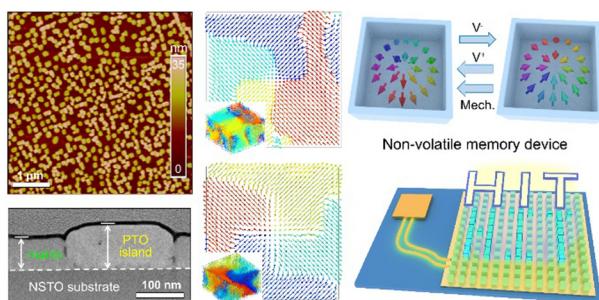
## COMMUNICATIONS

2179

**A self-powered HgTe quantum dots/PBDB-T:Y6 bipolar broadband photodetector for logic gates**

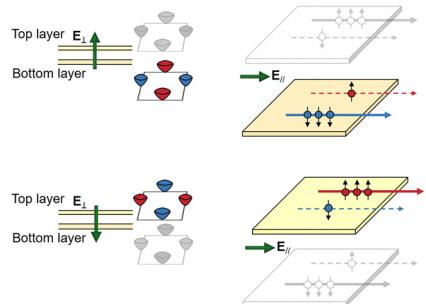
Wenxin Zeng, Zaihua Duan,\* Yichen Bu, Haichao Yu, Changhong Wang, Xing Tang, Jingwen Yang, Zhen Yuan, Yadong Jiang and Huiling Tai\*

2187

**Polar topology in self-assembled PbTiO<sub>3</sub> ferroelectric nano-islands**

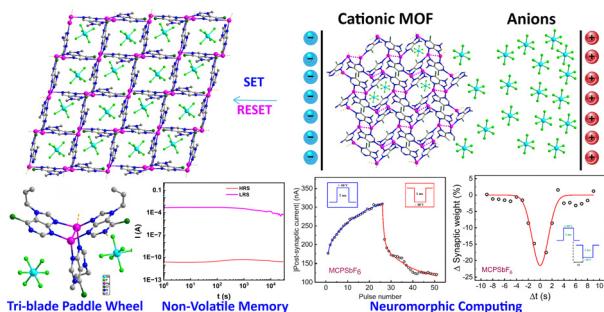
Jie Wang, Chao Yang, Dongqing Qi, Ning Lu, Chuanhui Chen, Gang Tian, Hong Fang, Kepeng Song,\* Weiming Lv\* and Limei Zheng\*

2197

**All-electrical layer-spintronics in altermagnetic bilayers**

Rui Peng,\* Jin Yang, Lin Hu, Wee-Liat Ong, Pin Ho, Chit Siong Lau, Junwei Liu and Yee Sin Ang\*

2208

**Silver-purine MOFs for high-performance multi-terminal neuromorphic memory**

Subhra Jyoti Panda, Kanha Ram Khator, Priyanka Deswal, Shashwat Nayak, Durgesh Pandey, Suraj K. Patel, Suraj Kumar Agrawalla, Dibyajyoti Ghosh,\* Satyaprasad P. Senanayak\* and Chandra Shekhar Purohit\*

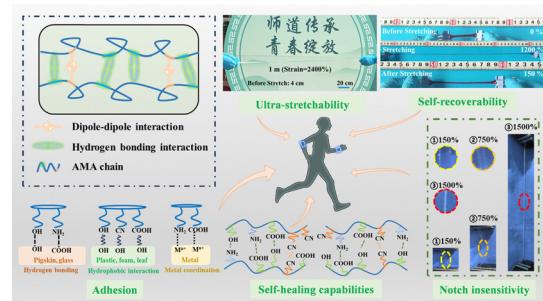


## COMMUNICATIONS

2223

**Ultra-stretchable, self-recoverable, notch-insensitive, self-healable and adhesive hydrogel enabled by synergistic hydrogen and dipole–dipole crosslinking**

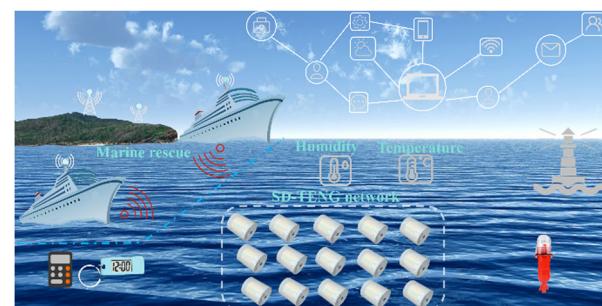
Wanting Yuan, Yi He, Qianqian Liang, Hongyi Lv, Ziqi Wang, Haitao Wu, Jinrong Wu, Lijuan Zhao\* and Yi Wang\*



2234

**High-performance triboelectric nanogenerator employing a swing-induced counter-rotating motion mechanism and a dual potential energy storage and release strategy for wave energy harvesting**

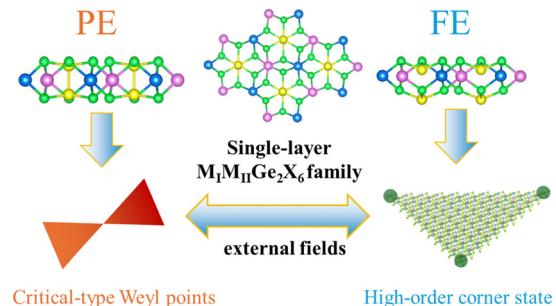
Feixiang Wang, Bao Cao, Leilei Shu, Zhe Li, Wen He, Zhongzhu Wang and Peihong Wang\*



2248

**Controllable topological phase transition via ferroelectric–paraelectric switching in a ferromagnetic single-layer  $M_I M_{II} Ge_2 X_6$  family**

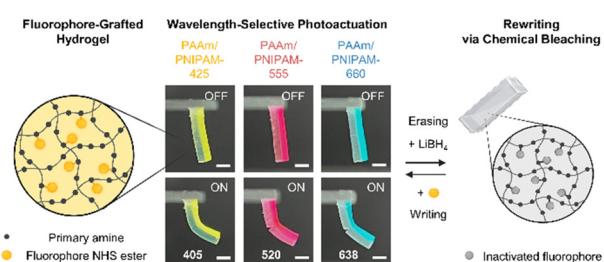
Jingbo Bai, Tie Yang, Zhenzhou Guo,\* Ying Liu, Yalong Jiao, Weizhen Meng\* and Zhenxiang Cheng\*



2255

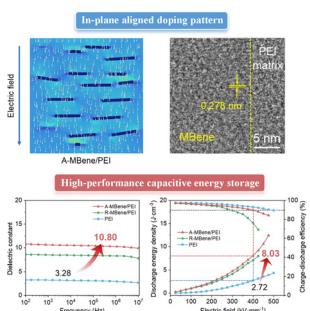
**Rewritable wavelength-selective hydrogel actuators grafted with fluorophores**

Hye Been Koo, Haemin Yeon, Young Bin Yoon, Taek-Jun Lee, Young-Tae Chang and Jae-Byum Chang\*



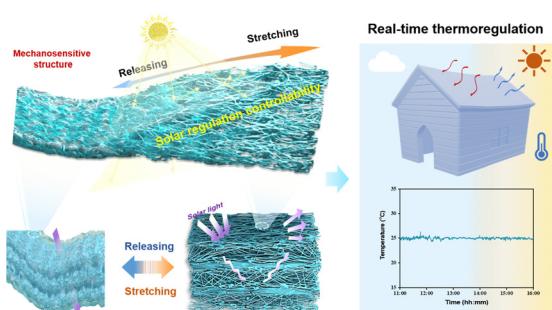
## COMMUNICATIONS

2267

**In-plane aligned doping pattern in electrospun PEI/MBene nanocomposites for high-temperature capacitive energy storage**

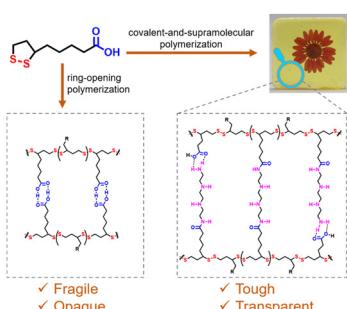
Sidi Fan, Ding Ai, Wenqi Zhang, Rui Yang, Guangyi Shen, Xiao Yang, Yonghong Cheng\* and Xiang Yu\*

2279

**Mechanosensitive stacking structure with continuous solar controllability for real-time thermal management**

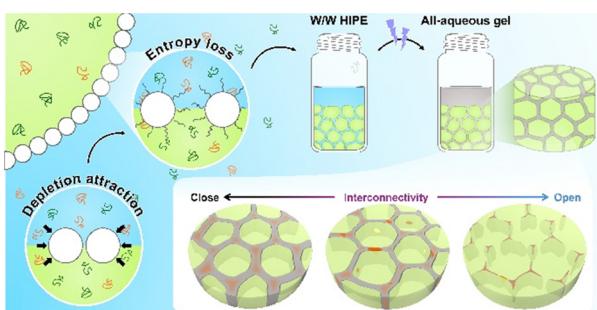
Richu Luo, Baiqi Song, Haixing Jiao, Qian Zhang,\* Fangling Li, Xiaofang Zhang\* and Weilin Xu

2287

**Supramolecular transparent plastic engineering via covalent-and-supramolecular polymerization**

Yunfei Zhang, Changyong Cai,\* Zhiyuan Guo, Xing Li,\* Gai Zhao\* and Shengyi Dong\*

2298

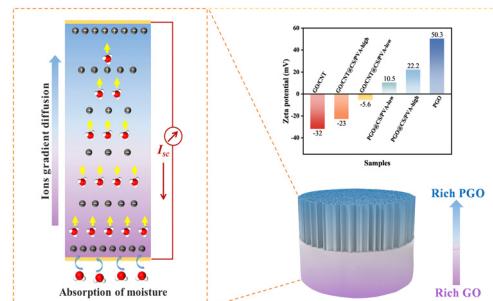
**Processable and controllable all-aqueous gels based on high internal phase water-in-water emulsions**

EunSuk Lee, YoungSeon Jo, YeRin Kim, Hojoon Yoon, SeoYoung Choi, Baekmin Q. Kim, Subeen Kim and KyuHan Kim\*



## COMMUNICATIONS

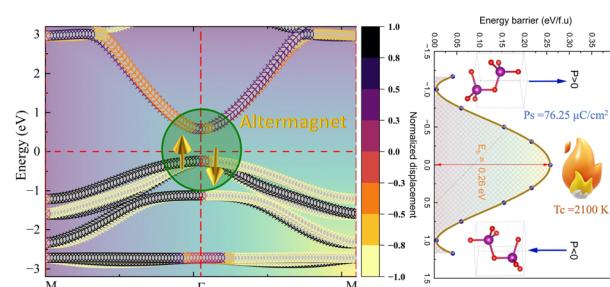
2309

**A self-sustained moist-electric generator with enhanced energy density and longevity through a bilayer approach**Jie Chen, Xuezhong Zhang, Minhan Cheng, Qianyang Li, Shuaijiang Zhao, Mao Zhang, Qiang Fu and Hua Deng\*  
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

2319

**Coexistence of altermagnetism and robust ferroelectricity in a bulk MnO wurtzite structure**

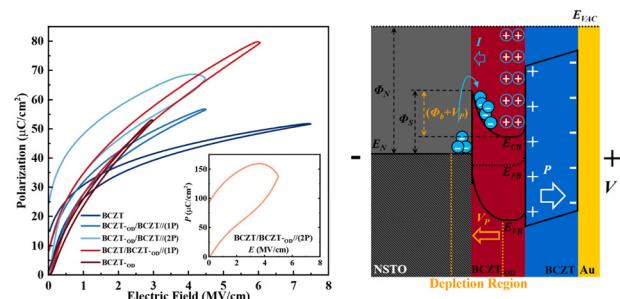
Imran Khan, Djamel Bezerga and Jisang Hong\*



2328

**Boosting the energy storage performance of BCZT-based capacitors by constructing a Schottky contact**

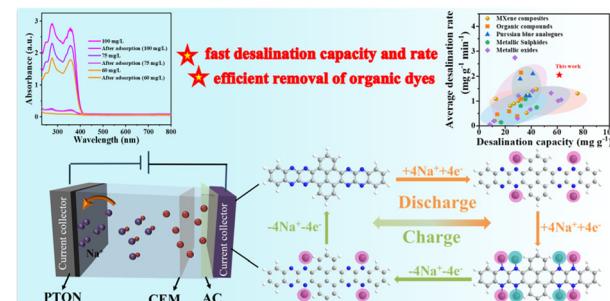
Zixiong Sun,\* Haoyang Xin, Liming Diwu, Zhanhua Wang,\* Ye Tian, Hongmei Jing, Xiuli Wang, Wanbiao Hu, Yongming Hu\* and Zhuo Wang\*



2341

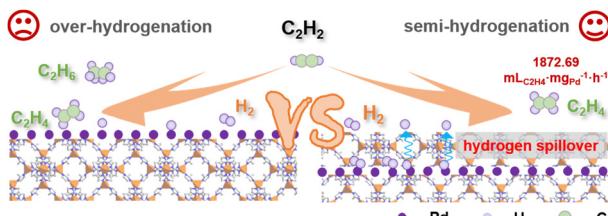
**A ladder-type organic molecule with pseudocapacitive properties enabling superior electrochemical desalination**

Yujie Cui, Yueheng Tao, Jun Yang,\* Houxiang Wang, Peipei Zhang, Guangxing Li, Minjie Shi\* and Edison Huixiang Ang\*



## COMMUNICATIONS

2351



### Acetylene semi-hydrogenation catalyzed by Pd single atoms sandwiched in zeolitic imidazolate frameworks via hydrogen activation and spillover

Yan-Ting Li, Wen-Gang Cui, Ying-Fei Huo, Lei Zhou, Xinqiang Wang, Fan Gao, Qiang Zhang, Wei Li and Tong-Liang Hu\*

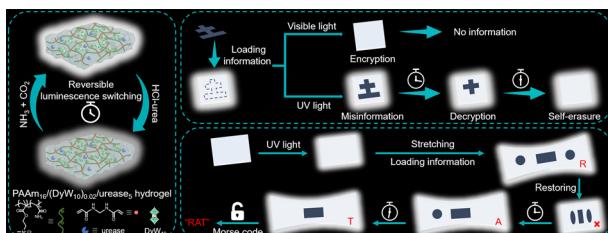
2360

Letter	Morse code	Patterns	Incomplete	→	Complete
A	• —			→	
B	— • • •			→	
C	— • — •			→	

### Long-chain crosslinker-induced patterning on an elastic polymer film for robust and reversible information encryption/decryption

Qitong He, Qiuhsua Zhao and Lidong Zhang\*

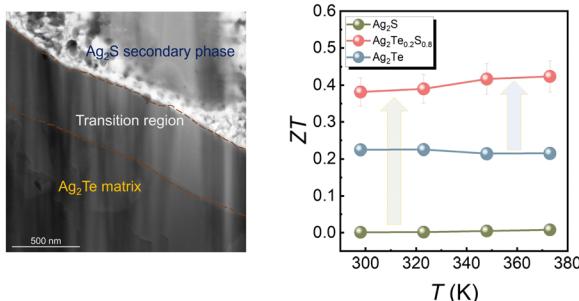
2369



### Lanthanide–polyoxometalate-based self-erasing luminescent hydrogels with time-dependent and resilient properties for advanced information encryption

Yumei Hua, Jingfang Li,\* Min Gao, Liye Liang, Sicong Zhao and Guangming Li\*

2380



### Solvothermally optimizing Ag<sub>2</sub>Te/Ag<sub>2</sub>S composites with high thermoelectric performance and plasticity

Min Zhu, Xiao-Lei Shi, Meng Li, Hao Wu, De-Zhuang Wang, Liang-Cao Yin, Ting Wu, Wei-Di Liu, Yan Huang, Zhi-Gang Chen\* and Qingfeng Liu\*



## COMMUNICATIONS

2389

**Ultimate water capillary evaporation in bamboo-inspired evaporator**

Kefan Shi, Marliyana Aizudin, Meilan Pan\* and Edison Huixiang Ang\*

