

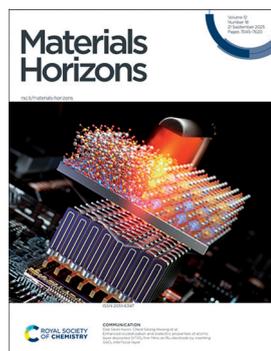
# Materials Horizons

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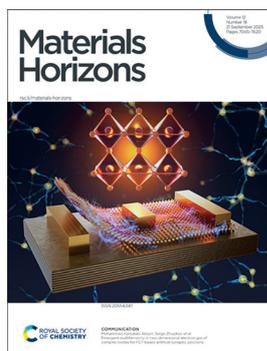
## IN THIS ISSUE

ISSN 2051-6347 CODEN MHAOAL 12(18) 7045-7620 (2025)



### Cover

See Dae Seon Kwon, Cheol Seong Hwang *et al.*, pp. 7305–7317. Image reproduced by permission of Cheol Seong Hwang *et al.* from *Mater. Horiz.*, 2025, 12, 7305.



### Inside cover

See Mohammad Karbalaei Akbari, Serge Zhuiykov *et al.*, pp. 7318–7332. Image reproduced by permission of Mohammad Karbalaei Akbari and Serge Zhuiykov from *Mater. Horiz.*, 2025, 12, 7318.

## EDITORIAL

7058

**Materials Horizons Emerging Investigator Series:**  
Professor Dr Teng Fu, Sichuan University, China

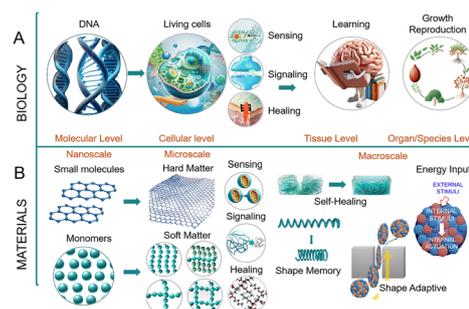


## OPINION

7060

**Living dynamic polymeric materials**

Jiahui Liu and Marek W. Urban\*



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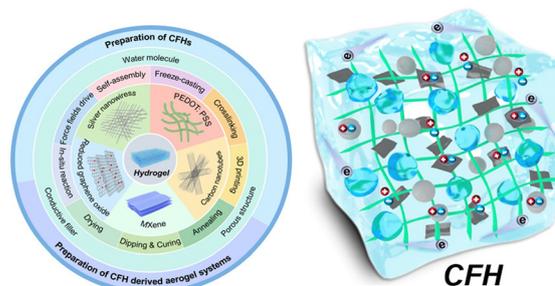


## REVIEWS

7066

### Advances in conductive filler-integrated hydrogels and derived aerogels: innovative strategies for electromagnetic interference shielding

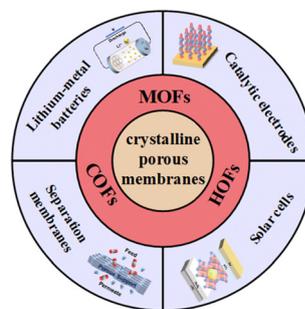
Changzheng Zhang, Yawen Zhang, Yang Wang\* and Yi Huang\*



7101

### Crystalline porous membrane devices: emerging architectures for carbon-neutral technologies

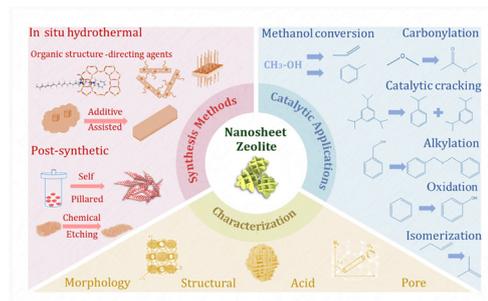
Zifeng Chen, Chong Li, Zerong Ge, Shicong Wu, Bin Liang\* and Xian-He Bu



7133

### Nanosheet zeolites: controlled synthesis, characterization, and advanced catalysis applications

Yankai Bian, Xiaoyang Zhang, Jun Yu\* and Weili Dai\*



7160

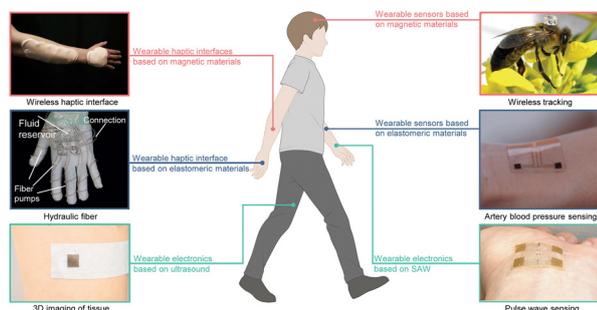
### Becoming a foodie in virtual environments: simulating and enhancing the eating experience with wearable electronics for the next-generation VR/AR

Shaoru Cheng, Chunyu Yang, Qi Wang, Akhil Canumalla and Jinghua Li\*



## REVIEWS

7192



### Advances in mechanically active materials for soft wearable electronics

Kedong Wu, Weixiang He, Ruyue Zhong, Zhongyi Nie, Xiang Lin and Mengdi Han\*

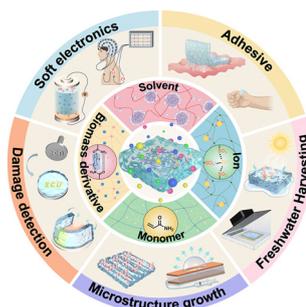
7221



### Recent progress in perovskite photodetectors: from carrier dynamics to device structures and applications

Ya Mo, Xiaoyue Huang, Qian Hu, Chuanqun Hu, Paul K. Chu and Jia Li\*

7244



### Toughening hydrogels with small molecules: tiny matter, big impact

Zhihua Sha, Xin Chen, Hao Song, Yong Zheng,\* Wei Cui\* and Rong Ran\*

7277



### 2D van der Waals heterostructure memristors: from band structure regulation to neuromorphic computing applications

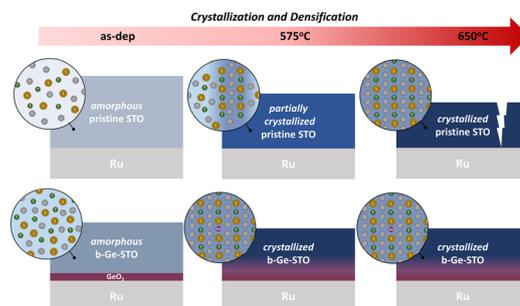
Xiao-Fang Luo, Xiao-Bin Guo, Dan Zhang, Qi-Jun Sun, Wen-Hua Li, Yan-Ping Jiang and Xin-Gui Tang\*



7305

### Enhanced crystallization and dielectric properties of atomic layer deposited SrTiO<sub>3</sub> thin films on Ru electrode by inserting GeO<sub>2</sub> interfacial layer

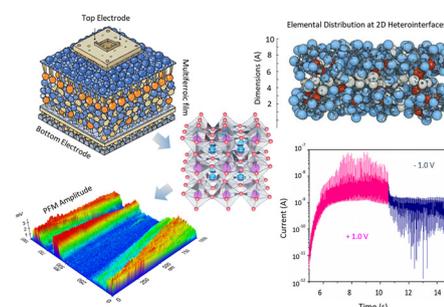
Heewon Paik, Junil Lim, Haengha Seo, Tae Kyun Kim, Jonghoon Shin, Haewon Song, Dong Gun Kim, Woongkyu Lee, Dae Seon Kwon\* and Cheol Seong Hwang\*



7318

### Emergent multiferroicity in two-dimensional electron gas of complex oxides for FET-based artificial synaptic junctions

Mohammad Karbalaee Akbari,\* Yanbin Cui, Christophe Detavernier and Serge Zhuiykov\*

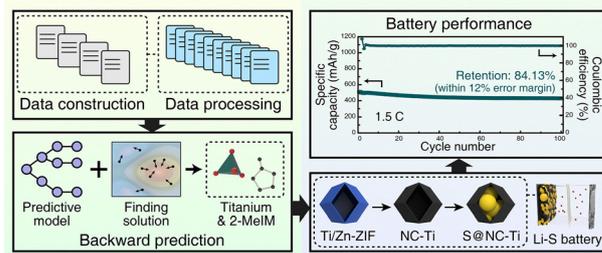


7333

### Machine learning-assisted design of cathode materials for lithium–sulfur batteries derived from a metal–organic framework

Seoyeah Oh, Kyeom Choi, Jihyeon Park, Geonho Kim, Seoyoung Yoon, Dongjun Kim, Seokhee Lee and Jiwon Kim\*

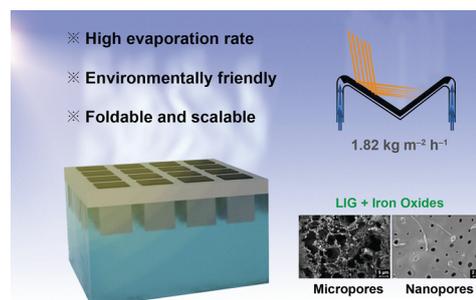
#### Machine learning-assisted MOF design for Li-S battery cathode



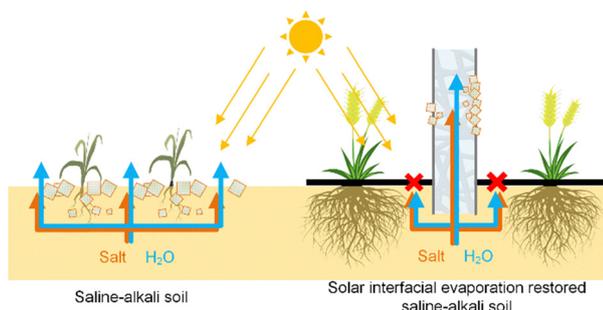
7346

### Iron-catalyzed laser-induced graphene on cellulose paper for solar-driven interfacial evaporation

Jing Zhang, Yujun Wei, Penghui Chen, Zhijian Huang, Qixu Yu, Jing Tan, Hongzhen Zeng and Shudong Yu\*



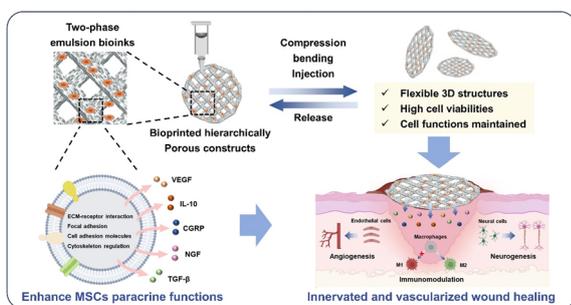
7358



### A zero-wastewater-discharge noncontact solar desalter for saline-alkali soil remediation and grain yield increase using brackish water

Xiangyang Dong, Xiangyu Luo, Zhenghui Huang, Shuai Ye, Chang Chen, Jingtao Xu, Zhen Wang, Xiaoliang Meng, Wensheng Zhao, Ronggui Yang, Chaoji Chen\* and Hongbing Deng\*

7370



### Injectable scaffolds with a hierarchically porous structure and augmented paracrine activity for minimally invasive precision medicine

Lin Du, Hongjian Zhang,\* Ziyi Zhao, Xueru Ma, Jimin Huang, Jinzhou Huang and Chengtie Wu\*

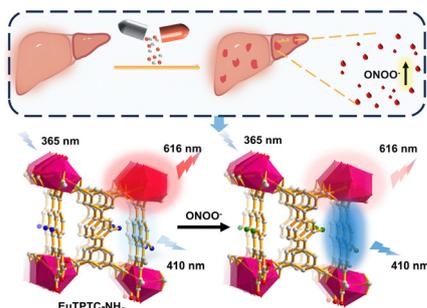
7389

Triple Alloying in Halide Perovskites (HP): A-, B- or X- site		
ABX <sub>3</sub> Single HP	Halide Perovskite Alloy	Property Variation
<p>● A Site</p> <p>● B Site</p> <p>● X Site</p>	<p>● X Site</p> <p>Halogen mixing: Cl, Br, I</p> <p>● A Site</p> <p>Alkali mixing: K, Rb, Cs</p> <p>● B Site</p> <p>Column IV mixing: Ge, Sn, Pb</p> <p>Hetero-valent mixing: Cd, Sn, Pb</p>	<p>Mixing Enthalpy <math>\Delta H</math></p> <p>vs.</p> <p>Band gap <math>\Delta E_g</math></p>

### Alloying multiple halide perovskites on the same sublattice in search of stability and target band gaps

Fernando P. Sabino,\* Jia-Xin Xiong, Xiuwen Zhang, Gustavo M. Dalpino and Alex Zunger

7402



### An amino-functionalized lanthanide-organic framework for ratiometric detection of ONOO<sup>-</sup>

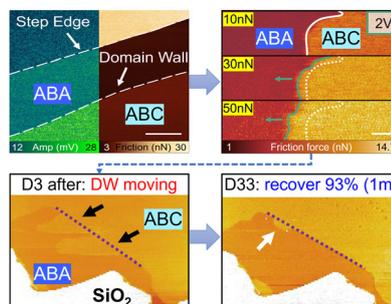
Huimin Zhuo, Xiao Liu, Congmin Sun, Yang Liu, Jiaqi Deng, Xu He, Ping Chen, Zhiqiang Li,\* Jing Liang\* and Qingqing Xiong\*



7409

## Reversible electromechanical manipulation of domain wall in trilayer graphene via ferroelectric sliding

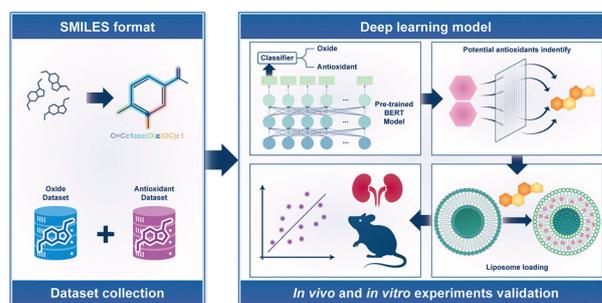
Zhao Liu,\* Yunyun Wei, Wengen Ouyang, Junyan Zhang and Feng Luo\*



7416

## Deep learning-enhanced development of innovative antioxidant liposomal drug delivery systems from natural herbs

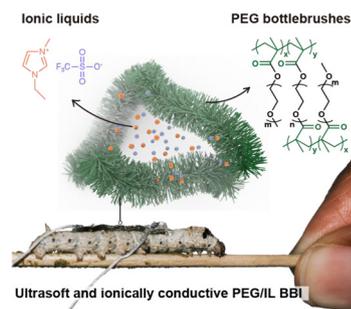
Xiaohu Zhang, Zhihang Zheng, Lina Xie, Minghao Yang, Jing Wang, Weiwei Wang, Shuyan Han,\* Zhen Zhang\* and Jun Wu\*



7425

## Ultrasoft, elastic, and ionically conductive polyethylene glycol/ionic liquid bottlebrush ionogels

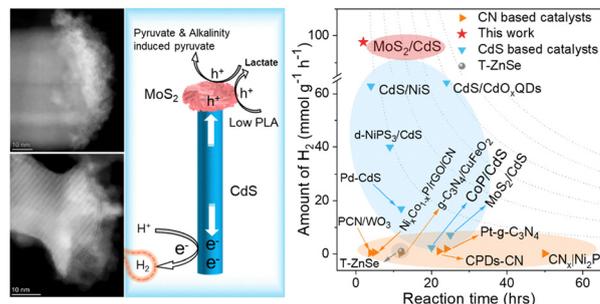
Pengfei Xu, Siddhartha Challa, Zefang Zhang, Xia Wu, Shaojia Wang, Peng Pan\* and Xinyu Liu\*



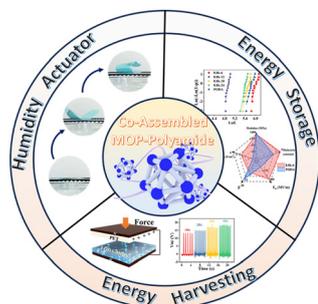
7439

## An asymmetrically tipped MoS<sub>2</sub>/CdS heterostructure for high-performance photocatalytic plastic reforming

Yu Yao, Jinqiang Zhang,\* Panpan Zhang, Lei Shi, Kunsheng Hu, Tara Pukala, Yanlin Shi, Zhongfan Jia, Shaobin Wang and Xiaoguang Duan\*



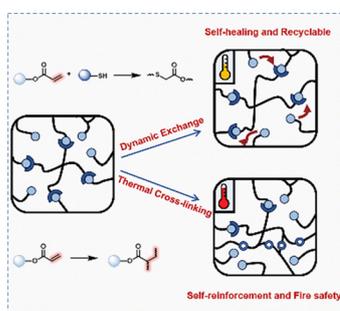
7450



### A co-assembly strategy for the construction of robust, recyclable and multifunctional crosslinked metal–organic polyhedra using aromatic polyamides

Chen Huang, Shuqiang Xiong, Na Li, Junrong Yu, Zuming Hu and Yan Wang\*

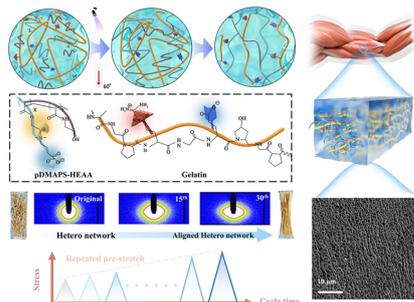
7463



### Thermally activated and fire-resistant thiol-Michael dynamic crosslinking networks for wildfire prevention

Yin-Long Wang, Xi Zhao, Xiu-Li Wang,\* Yu-Zhong Wang and Teng Fu\*

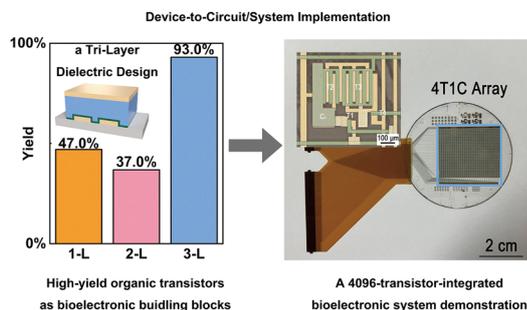
7473



### Mechanical training drives structural remodeling of zwitterionic hydrogels

Jiating Liu, Jin Chen, Simin Liu, Tao Li, Ying Chen, Liuyan Chen, Rong Cai, Xizhi Liao, Tian Zhao and Yi Chen\*

7486



### Bioelectronic building blocks: low-voltage integrable organic thin-film transistors with a tri-layer gate dielectric design

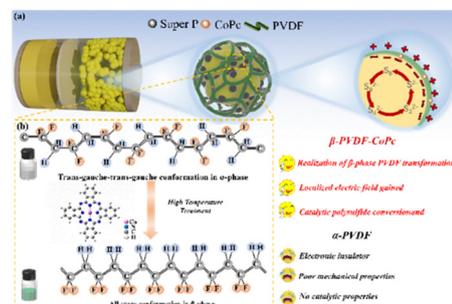
Taoming Guo, Ran Wang, Yaojie Zheng, Huazhong Yang, Yongpan Liu, Teng Yi, Wei Tang\* and Chen Jiang\*



7495

### Smart functional binders empowering lithium–sulfur cathodes with enhanced atmospheric stability and catalytic kinetics

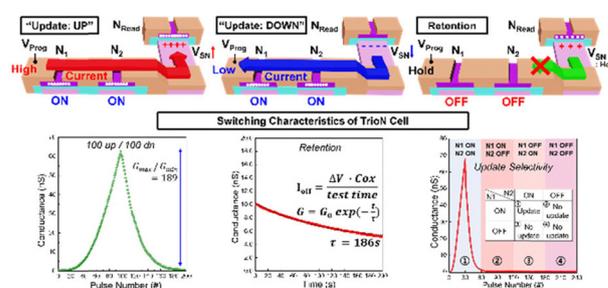
Shengrui Cui, Ning Wang, Yanyun Zhang, Minghui Zhang, Youjun Xing, Tiancheng Wang, Weiya Li, Wei Liu,\* Seung-Taek Myung\* and Yongcheng Jin\*



7509

### Highly-efficient and scalable TrioN (3N0C) synaptic cell for analog process-in-memory

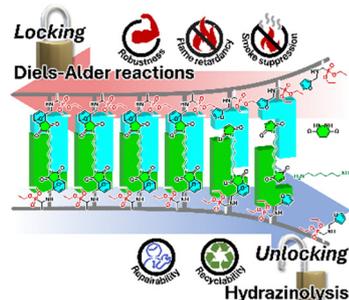
Junyoung Choi, Byoungwoo Lee, Jinho Byun, Hyejin Kim, Seungkun Kim, Junyong Lee, Hyunjeong Kwak, Jeonghoon Son and Seyoung Kim\*



7520

### High-performance yet sustainable epoxy composites: from Diels–Alder chemistry to hydrazinolytic degradation

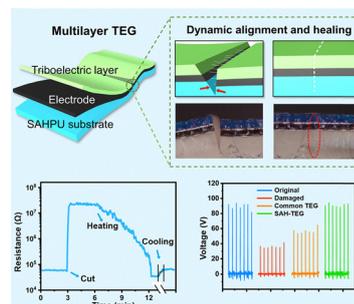
Song Gu, Jia-Xin Zhao, Shi-Huan Tan, Yan-Fang Xiao, Yu-Zhong Wang and Li Chen\*



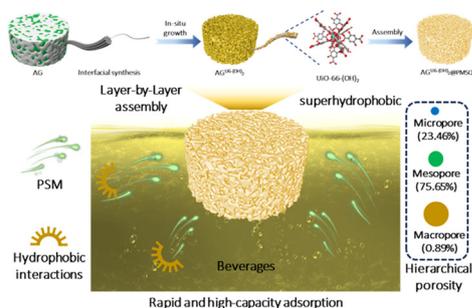
7531

### Bioinspired self-driven realignment and healing in multilayer triboelectric generators enabled by reversibly actuated polyurethane

Guang Yang,\* Yixuan Su, Ying Liu, Hanbing Ma, Vitali Lipik, Jing Yan\* and Xupin Zhuang\*



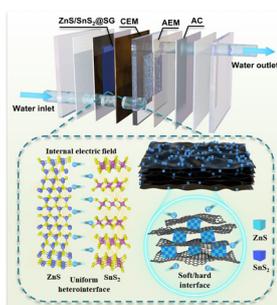
7545



### A layer-by-layer assembled superhydrophobic composite aerogel for rapid and high-capacity removal of microplastics from beverages

Qiyue Zhao, Xingxu Jiang, Ergen Bao, Hong-Man Hou, Gong-Liang Zhang and Jingran Bi\*

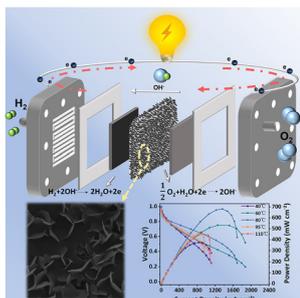
7558



### "Macro to micro" interface engineering-manipulated tin disulfide for stable and highly efficient sodium-ion electrified capture

Yifan Ren, Ziqing Zhou, Mingxing Liang, Ningning Liu, Xiaochen Zhang, Fei Yu, Xin-Gui Li\* and Jie Ma\*

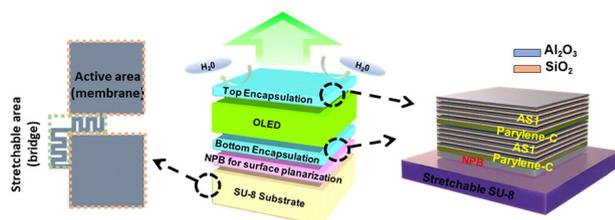
7570



### An LDH-enhanced porous polyethersulfone membrane doped with alkali for anion exchange membrane fuel cells

Yindong Wang, Wei Liu, Shu Shang, Meijuan Liu, Zhixuan Ying, Xiang Ao and Le Shi\*

7580



### Highly reliable organic light-emitting diodes with optimized fill factor based on rotational membrane design for stretchable displays

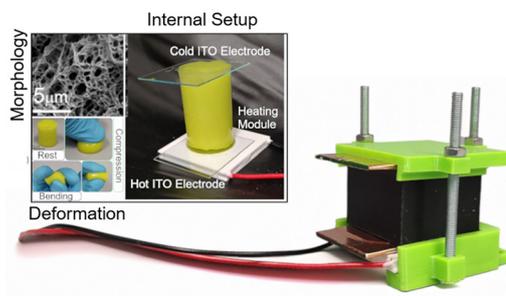
Young Hyun Son, Sun-Woo Lee, Myung Sub Lim, Taek-Soo Kim, Jeong Hyun Kwon\* and Kyung Cheol Choi\*



7594

## Hydrogel-based thermoelectrochemical cells for waste heat recovery under passive cooling conditions

Matteo Bevione, Gopal Narmada Naidu and Giulia Tagliabue\*



7606

## Thermally conductive under-liquid adhesives via the synergistic effect of intrinsic interfacial toughness and mechanical dissipation

Xiangchao Xie, Jianfeng Fan,\* Chen Zeng, Ke Ou, Yabiao Ma, Gaohong Lv, Jianbin Xu, Rong Sun and Xiaoliang Zeng\*

