

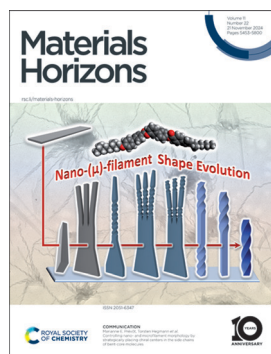
# Materials Horizons

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## IN THIS ISSUE

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### Cover

See Marianne E. Prévôt, Torsten Hegmann *et al.*, pp. 5550–5563. Image reproduced by permission of Grace A. R. Rohaley and Torsten Hegmann from *Mater. Horiz.*, 2024, 11, 5550.



### Inside cover

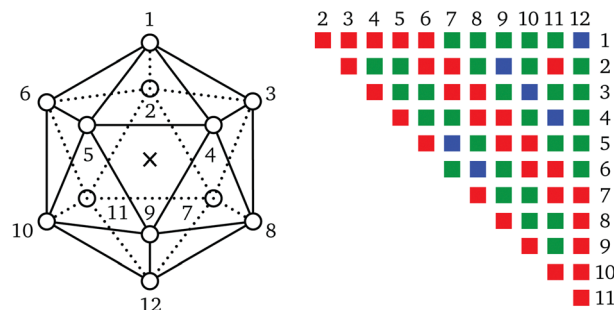
See Zhengbao Zha *et al.*, pp. 5564–5577. Image reproduced by permission of Zhengbao Zha from *Mater. Horiz.*, 2024, 11, 5564.

## FOCUS

5464

### Towards an information-based theory of structure

Glenn D. Hibbard and John Çamkıran

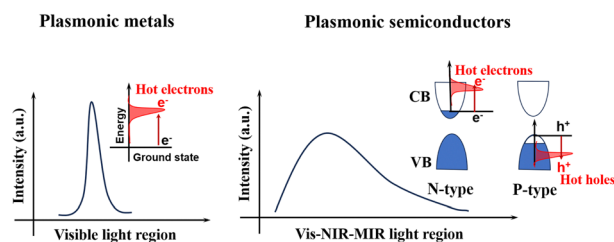


## REVIEWS

5470

### Full-spectrum plasmonic semiconductors for photocatalysis

Xiaolei Liu, Baibiao Huang, Juan Li,\* Baojun Li and Zaizhu Lou\*



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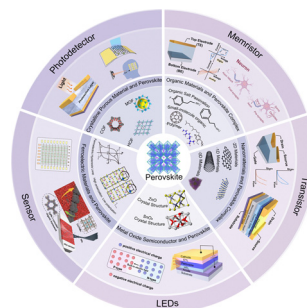


## REVIEWS

5499

## Recent advances in artificial neuromorphic applications based on perovskite composites

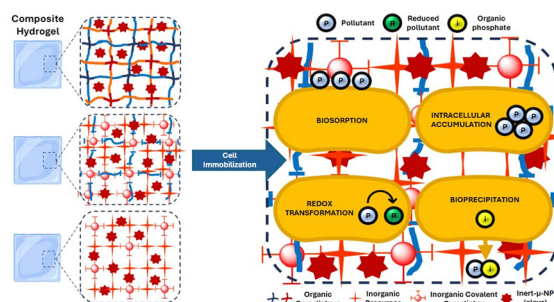
Huaxin Li, Qingxiu Li, Tao Sun, Ye Zhou and Su-Ting Han\*



5533

## Clay–polymer hybrid hydrogels in the vanguard of technological innovations for bioremediation, metal biorecovery, and diverse applications

Miguel A. Ruiz-Fresneda,\* Eduardo González-Morales, Cristina Gila-Vilchez, Alberto Leon-Cecilla, Mohamed L. Merroun, Antonio L. Medina-Castillo and Modesto T. Lopez-Lopez

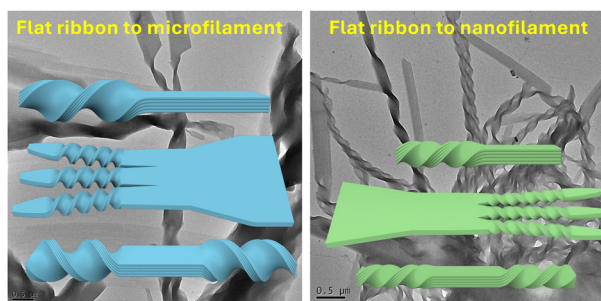


## COMMUNICATIONS

5550

## Controlling nano- and microfilament morphology by strategically placing chiral centers in the side chains of bent-core molecules

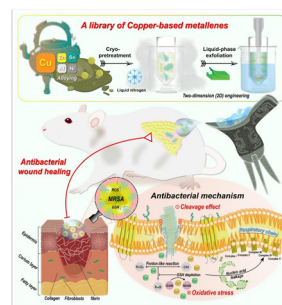
Ashwathanarayana Gowda, Gourab Acharjee, Suraj Kumar Pathak, Grace A. R. Rohaley, Asmita Shah, Robert P. Lemieux, Marianne E. Prévôt\* and Torsten Hegmann\*



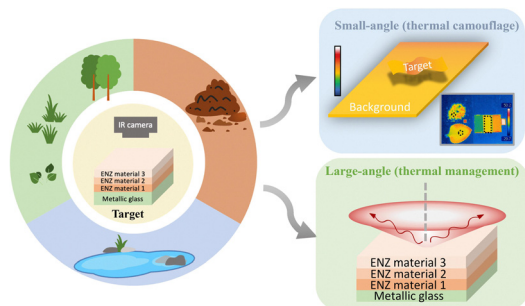
5564

## A small library of copper-based metallenes with superior antibacterial activity

Zhaohua Miao, Chenxin Lu, Cheng-Yan Xu, Yan Ma, Zhong Cao, Lulu Liu, Deyan Gong and Zhengbao Zha\*



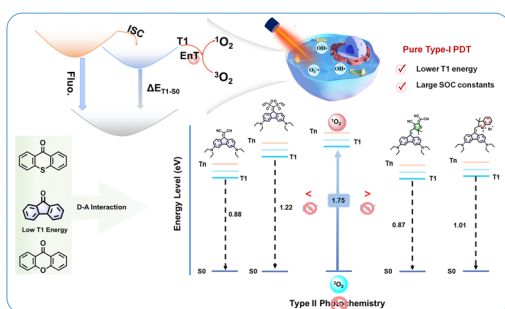
5578



### Epsilon-near-zero thin films in a dual-functional system for thermal infrared camouflage and thermal management within the atmospheric window

Pei-Chi Hsieh, Sih-Wei Chang, Wei-Hsuan Kung, Tzu-Chieh Hsiao and Hsuen-Li Chen\*

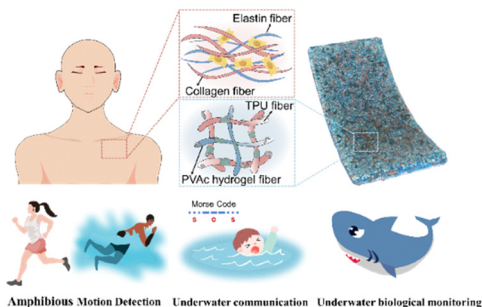
5589



### De novo design of type-I photosensitizer agents based on structure-inherent low triplet energy for hypoxia photodynamic therapy

Xiao-Yun Ran, Wen-Li Xia, Li-Na Zhang, Xiao-Qi Yu, Ping Chen, Kun-Peng Xie, Yu Zhao, Cheng Yi and Kun Li\*

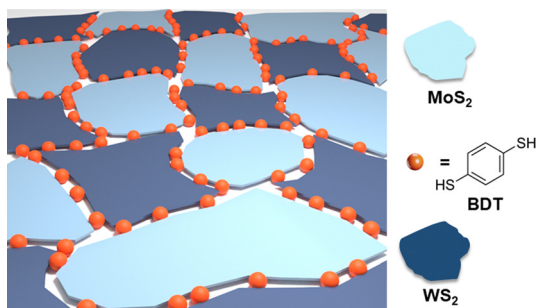
5600



### Strong and anti-swelling nanofibrous hydrogel composites inspired by biological tissue for amphibious motion sensors

Zheng Ren, Fang Guo, Yong Wen, Yang Yang, Jinxin Liu and Si Cheng\*

5614



### Defect-engineering of liquid-phase exfoliated 2D semiconductors: stepwise covalent growth of electronic lateral hetero-networks

Antonio Gaetano Ricciardulli, Christopher E. Petoukhoff, Anna Zhuravlova, Adam G. Kelly, Chun Ma, Frédéric Laquai, Jonathan N. Coleman and Paolo Samori\*

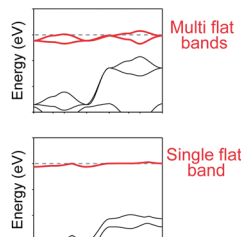


5622

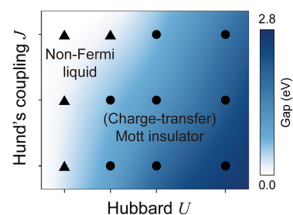
### Non-Fermi liquid to charge-transfer Mott insulator in flat bands of copper-doped lead apatite

Sun-Woo Kim,\* Kristjan Haule, Gheorghe Lucian Pascut\* and Bartomeu Monserrat\*

Non-interacting band structures of LK-99 compound



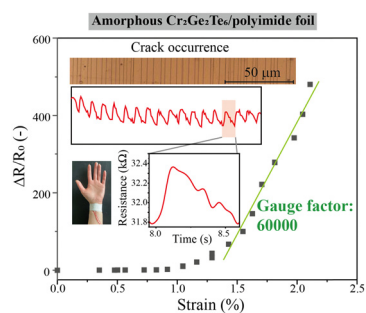
Interacting phase diagram



5631

### An amorphous $\text{Cr}_2\text{Ge}_2\text{Te}_6$ /polyimide double-layer foil with an extraordinarily outstanding strain sensing ability

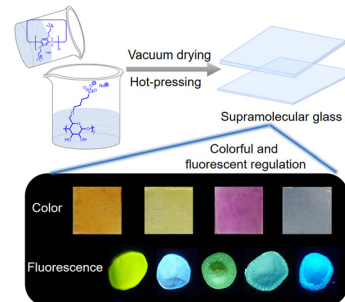
Yinli Wang, Yi Shuang, Mihyeon Kim, Daisuke Ando, Fumio Narita and Yuji Sutou\*



5641

### Supramolecular control over the variability of color and fluorescence in low-molecular-weight glass

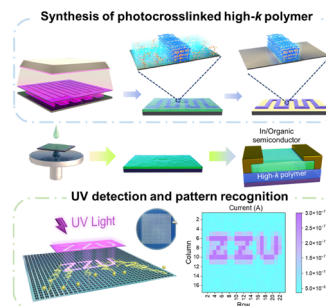
Yunfei Zhang, Changyong Cai, Fenfang Li, Xin Tan, Qing Li,\* Xinlong Ni\* and Shengyi Dong\*



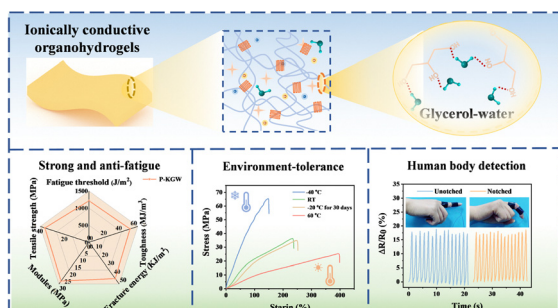
5650

### Solution-processed high- $k$ photopatternable polymers for low-voltage electronics

Qingqing Sun, Hongwei Ge, Shuai Wang, Xiaohang Zhang, Juzhong Zhang, Shisheng Li, Zhiqiang Yao, Lei Zhang and Xuying Liu\*



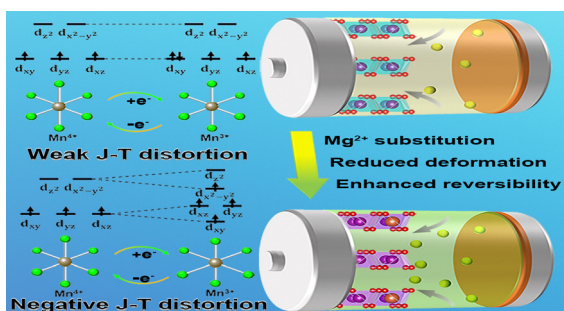
5662



### Strong, tough and environment-tolerant organohydrogels for flaw-insensitive strain sensing

Yuqing Wang, Zhanqi Liu, Yuntao Liu, Jun Yan, Haidi Wu, Hechuan Zhang, Huamin Li, Junjie Wang, Huaiguo Xue, Ling Wang, Yongqian Shi, Longcheng Tang, Pingan Song and Jiefeng Gao\*

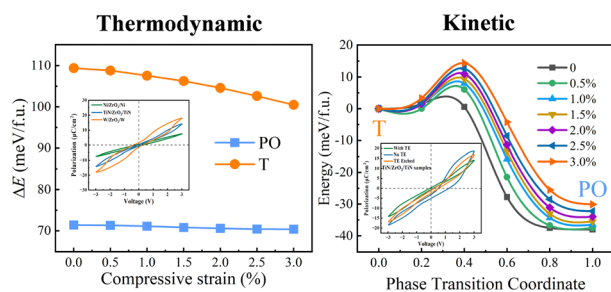
5674



### Inducing weak and negative Jahn–Teller distortions to alleviate structural deformations for stable sodium storage

Zishan Hou, Yuanming Liu, Shuyun Yao, Shiyu Wang, Yingjie Ji, Weijie Fu, Jiangzhou Xie, Yi-Ming Yan and Zhiyu Yang\*

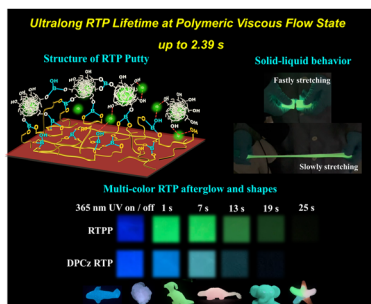
5684



### The contradiction between thermodynamic and kinetic effects of stress-modulated antiferroelectricity in $\text{ZrO}_2$ thin films

Qisheng He, Tao Yu, Binjian Zeng,\* Puqi Hao, Shuaizhi Zheng, Qiangxiang Peng, Yichun Zhou and Min Liao\*

5692



### Ultralong room temperature phosphorescence with multicolor afterglow achieved in a harsh polymeric viscous flow state

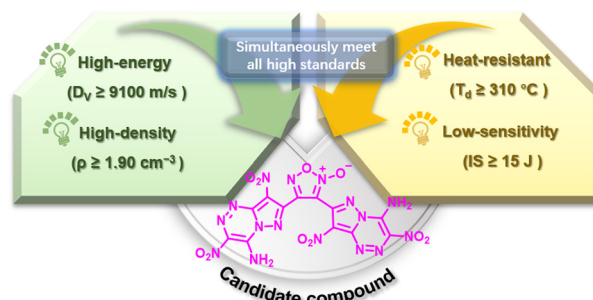
Shiyu Gu, Qi Wu\* and Jinrong Wu\*



5701

### An advanced furoxan-bridged heat-resistant explosive

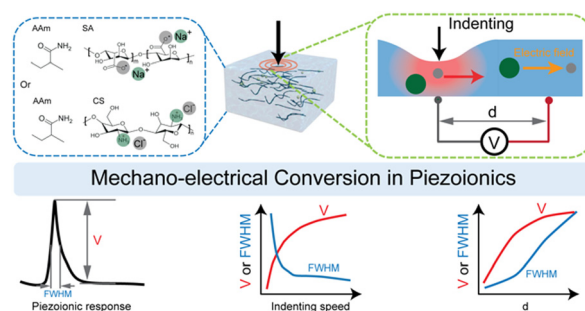
Chengchuan Li, Teng Zhu, Jie Tang, Caijin Lei, Guoyang Yu, Yanqiang Yang, Hongwei Yang,\* Chuan Xiao\* and Guangbin Cheng\*



5709

### A universal framework for determining the effect of operating parameters on piezoelectric voltage generation

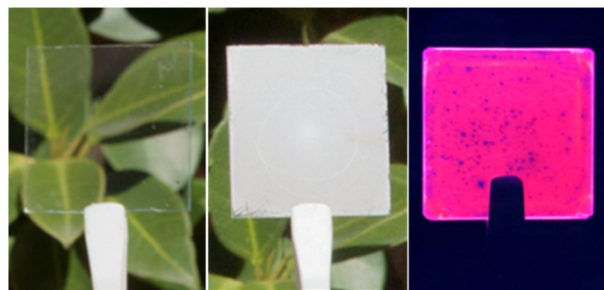
Jiangang Xu, Qiang Li and Derek Ho\*



5722

### Transparent porous films with real refractive index close to unity for photonic applications

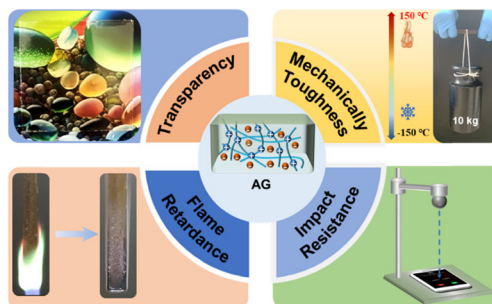
José M. Miranda-Muñoz, José M. Viaña, Mauricio E. Calvo, Gabriel Lozano\* and Hernán Míguez\*



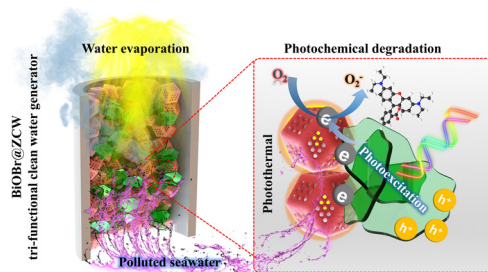
5732

### Optically transparent and mechanically tough glass with impact resistance and flame retardancy enabled by covalent/supramolecular interactions

Changyong Cai, Guohong Yao, Yunfei Zhang, Shiguo Zhang, Fenfang Li, Zhijian Tan\* and Shengyi Dong\*



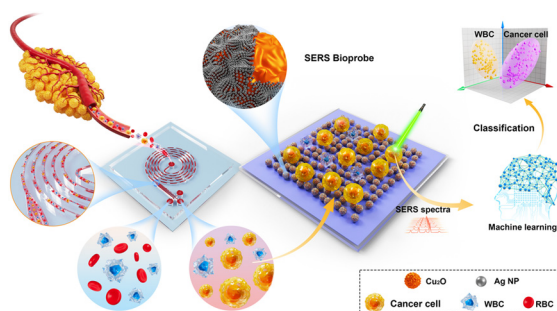
5740



### Efficient solar-driven freshwater generation through an inner hierarchical porous metal–carbon layer bridging synergistic photothermal evaporation and adsorption photodegradation

Haoyu Liu, Huaipeng Pang, Xinyu Yang, Wenhao Guo, Hongyan Xi, Xueli Ji, Lin Li and Fanlu Meng\*

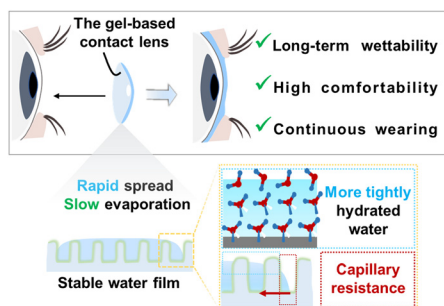
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### Precise diagnosis of tumor cells and hemocytes using ultrasensitive, stable, selective cuprous oxide composite SERS bioprobes assisted with high-efficiency separation microfluidic chips

Yujiao Xie, Lei Xu, Jiahao Zhang, Chenguang Zhang, Yue Hu, Zhouxu Zhang, Guoxin Chen, Shuyan Qi, Xiawei Xu, Jing Wang, Wenzhi Ren, Jie Lin\* and Aiguo Wu\*

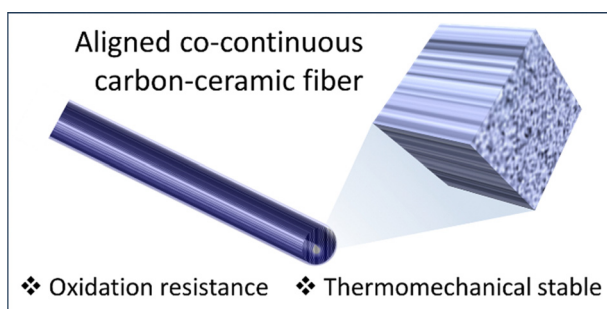
5768



### Rapid spread, slow evaporation: a long-lasting water film on hydrogel nanowire arrays for continuous wearables

Peijia Li, Yilin Wang, Ming Qiu, Yixiao Wang, Zhaoxiang Lu, Jianning Yu, Fan Xia, Yun Feng\* and Ye Tian\*

5777



### Synergistic enhancement of thermomechanical properties and oxidation resistance in aligned Co-continuous carbon–ceramic hybrid fibers

Jakob Denk, Xiaojian Liao,\* Martin Dulle, Stefan Schafföner, Stephan Förster, Andreas Greiner, Günter Motz\* and Seema Agarwal\*

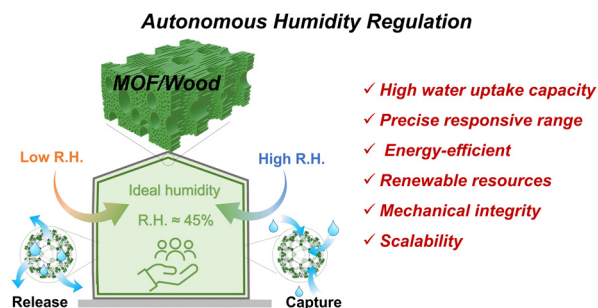


## COMMUNICATIONS

5786

**Autonomous humidity regulation by MOF/wood composites**

Kunkun Tu, Zhidong Zhang, Christopher H. Dreimol, Roman Günther, Robert Zboray, Tobias Keplinger, Ingo Burgert and Yong Ding\*



## CORRECTION

5798

**Correction: An amorphous Cr<sub>2</sub>Ge<sub>2</sub>Te<sub>6</sub>/polyimide double-layer foil with an extraordinarily outstanding strain sensing ability**

Yinli Wang, Yi Shuang, Mihyeon Kim, Daisuke Ando, Fumio Narita and Yuji Sutou\*

