

# Materials Horizons

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### Cover

See Hilary A. Johnson *et al.*, pp. 10623–10629. Image reproduced by permission of Lawrence Livermore National Lab from *Mater. Horiz.*, 2025, 12, 10623.

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**Materials Horizons Emerging Investigator Series: Professor Hyuk-Jun Kwon, Daegu Gyeongbuk Institute of Science and Technology (DGIST), Daegu, Republic of Korea**



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**Introduction to the soft wearable sensors themed collection**

Wenlong Cheng, Dae-Hyeong Kim, Nanshu Lu, John Rogers and Alina Rwei



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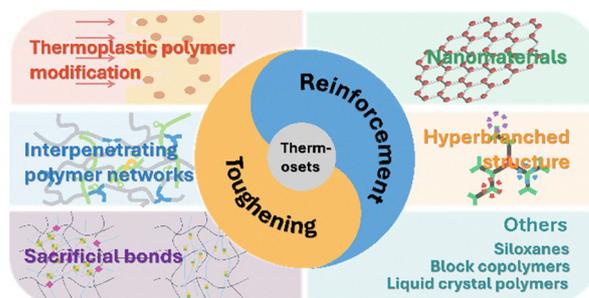
Fundamental questions  
Elemental answers

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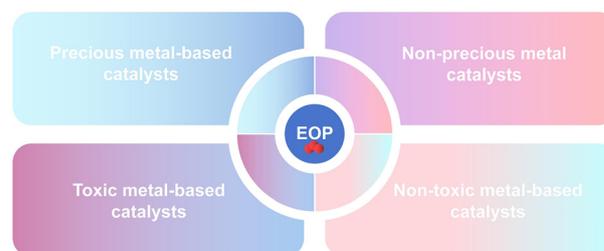
Shenao Xue, Zhen Yu, Zhaobin Tang and Yanlin Liu\*



10414

**Perspective on water electrolysis for ozone production: electrocatalyst design and development**

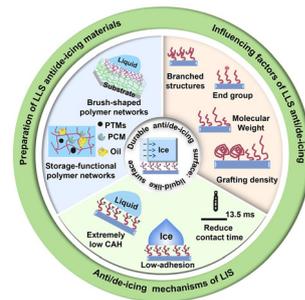
Zheng Zhu, Qiangqiang Song, Lili Jiang,\* Minmin Yan,\* Sheng Chen\* and Jingjing Duan\*



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**Toward durable anti/de-icing technologies: liquid-like surfaces with engineered abrasion resistance**

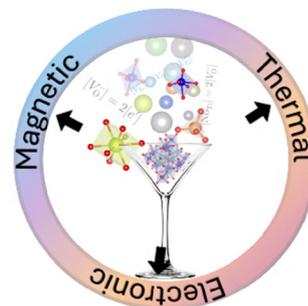
Yifan Yan, Fuchao Yang,\* Daheng Wu, Muhammad Sohail Asghar and Zhiguang Guo\*



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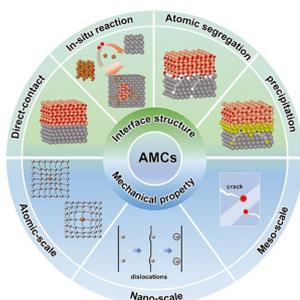
**Disorder by design: unveiling local structure and functional insights in high entropy oxides**

John P. Barber, William J. Deary, Andrew N. Titus, Gerald R. Bejger, Saeed S. I. Almishal and Christina M. Rost\*



## REVIEWS

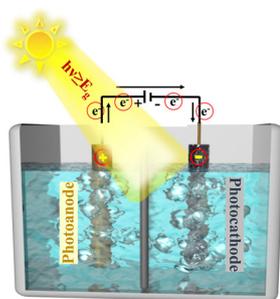
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### Recent advances in interface engineering in aluminum matrix composites reinforced by nano-ceramic phases: from atomic structure to mechanical performance

Zhenbo Wang, Xudong Rong,\* Dongdong Zhao,\* Xiang Zhang, Chunlian He and Naiqin Zhao\*

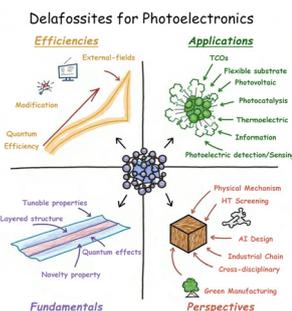
10498



### Advances and challenges of metal organic frameworks (MOFs) and derivatives in photoelectrocatalytic water splitting

Xin-Jie Tian, Si-Jia Guo, Zheng-Yi Wu, Na Xu, Guanqun Han,\* Yong-Ming Chai and Bin Dong\*

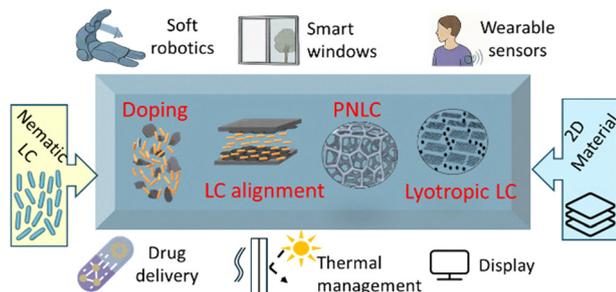
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### Emerging multi-functional delafossite materials: frontier advances and prospective breakthroughs in photoelectronic applications

Zong-Yan Zhao

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### A critical overview of the influence of graphene and its analogues on nematic liquid crystals

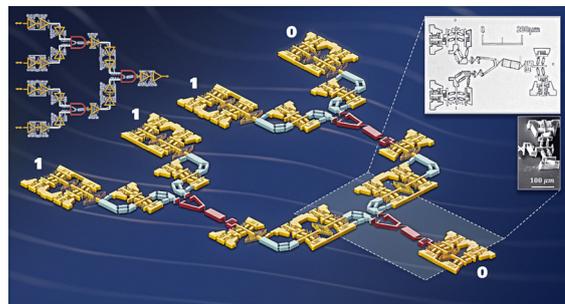
Pragnya Satapathy, Gayathri R. Pisharody, D. S. Shankar Rao, H. S. S. Ramakrishna Matte and S. Krishna Prasad\*



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## Signal propagation in reversible digital mechanics

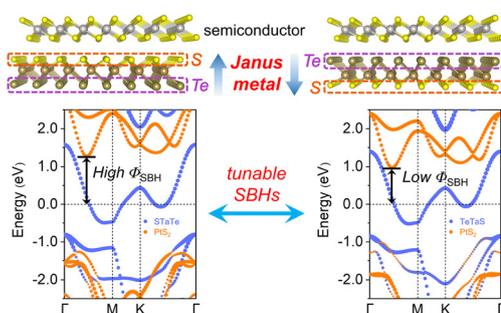
Hilary A. Johnson,\* Robert M. Panas,  
Amin Farzaneh, Frederick Sun, Logan Bekker,  
John Cortes, Melika Ahmadi, Julie Mancini,  
Andrew J. Pascall and Jonathan B. Hopkins



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## Janus metal-enabled tunable Schottky barriers in van der Waals contacts via interfacial polarization modulations

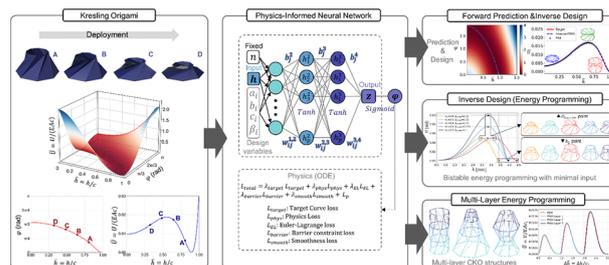
Yanze Feng, Liujuan Qi,\* Yu Du, Nan Zhang, Yuting Zou,  
Zhiming Shi, Dabing Li and Shaojuan Li\*



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## Physics-informed neural networks for programmable origami metamaterials with controlled deployment

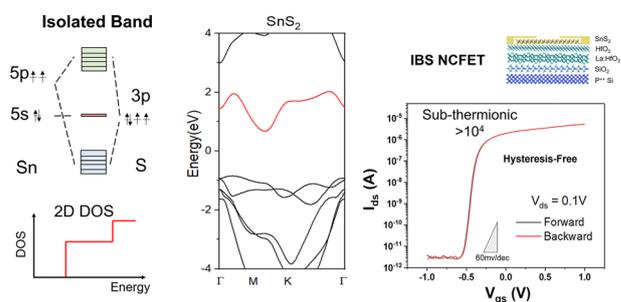
Sukheon Kang, Youngkwon Kim, Jinkyu Yang\* and  
Seunghwa Ryu\*



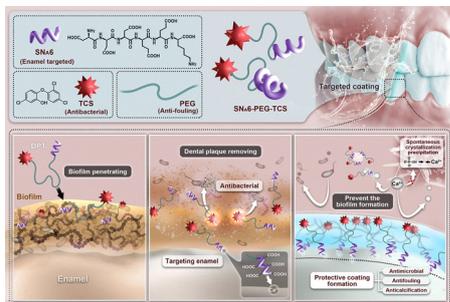
10656

Achieving wide-range steep slopes in SnS<sub>2</sub> negative capacitance transistors through an isolated band structure and thermionic emission enhancement via Bi contacts

Chong-Myeong Song, Jaewoo Park, Shinbuhm Lee and  
Hyuk-Jun Kwon\*



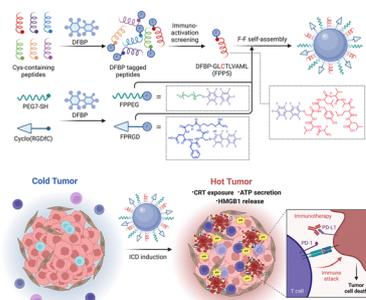
10664



### An engineered peptide–polymer conjugate mimics statherin to block dental calculus formation while preserving oral microbiota

Qiangwei Xin, Li Li, Peng Yu, Yao Zhao, Zhengxin Ma, Hongbo Zhang, Shiran Sun, Jun Luo, Liwei Zheng, Chunmei Ding,\* Yang Liu,\* Mingming Ding and Jianshu Li\*

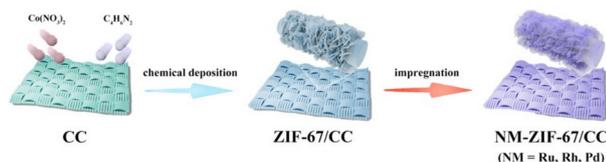
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### Fluorobenylation promotes immune-activating peptides to turn cold tumors into hot tumors

Ziqian Mu, Yudan Zhong, Yeli Fan, Junjie Yan, Lizhen Wang, Qian Xu, Donghui Pan, Yuping Xu, Chongyang Chen, Xinyu Wang\* and Min Yang\*

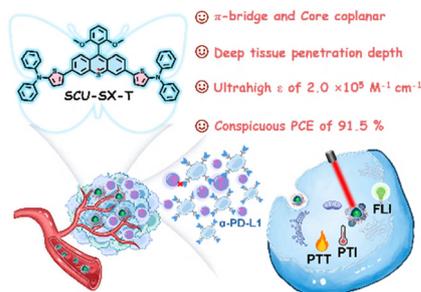
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### Atomically dispersed Ru in ZIF-67 as a high-performance HER catalyst: *in situ* structural evolution and deactivation mechanism elucidation

Zhe Liu, Rui Jin, Gui Zhao, Qinshan Tang, Tianrui Kang, Maolin Wang, Jia Liu, Xiaoxiao Huang,\* Bingrong Guo,\* Xi Liu\* and Siwei Li\*

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### $\pi$ -Bridge engineering strategy: tailoring S-xanthene dyes with strong absorption for high-efficiency photothermal therapy

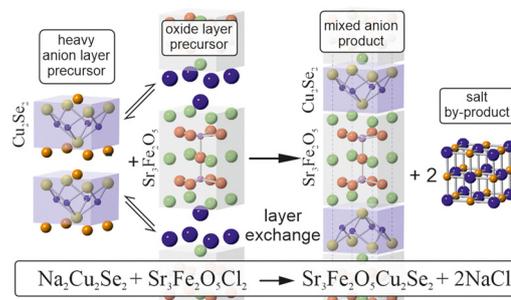
Yu Zhao, Rui-Rui Zhang, Nan Wang, Xiao-Li Tian, Li-Na Zhang, Wen-Li Xia, Zhou-Yu Wang, Xiao-Qi Yu\* and Kun Li\*



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## Metathesis and the building block approach to novel layered copper oxyseLENIDES – useful tool or synthetic dead-end?

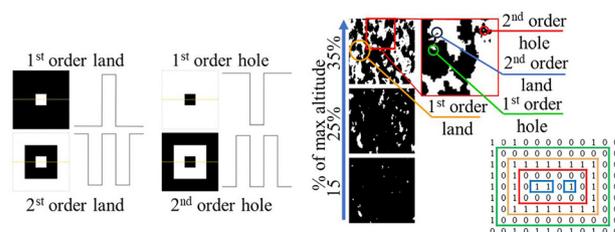
Liam Kemp\* and Geoffrey Hyett\*



10713

## Numerical and topological description of contact areas at different size scales for the contact of rough solid surfaces

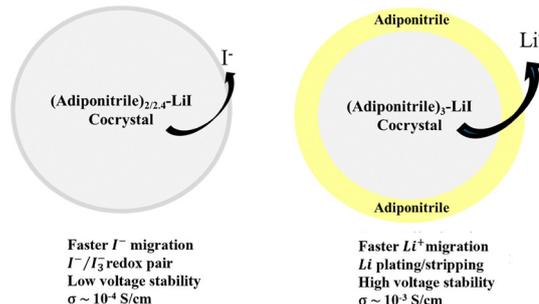
Aleksandr S. Aglikov, Mikhail V. Zhukov, Timur A. Aliev, Vladislav I. Maslii, Paul V. Gelfenshtein, Dmitry A. Kozodaev, Daria V. Andreeva,\* Michael Nosonovsky and Ekaterina V. Skorb\*



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## Grain boundary tuning determines iodide and lithium-ion migration in a solid adiponitrile–LiI molecular crystal electrolyte

Shujit Chandra Paul, William A. Goddard III, Michael Zdilla, Prabhat Prakash\* and Stephanie L. Wunder\*



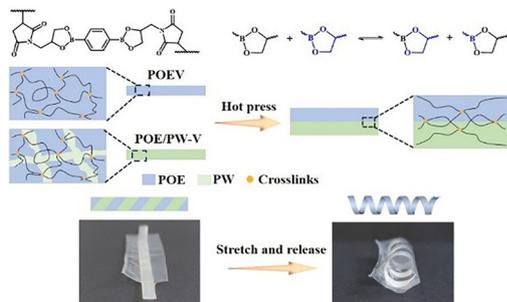
10740

## S-La<sub>2</sub>Mo<sub>2</sub>O<sub>9</sub> solid solution: a sulfur cathode with a non-shaped matrix enables a better lithium–sulfur battery

Hafiz Muhammad Umair Arshad, Jiamiao Suo, Qianyi Zhang, Xueping Gao and Guoran Li\*



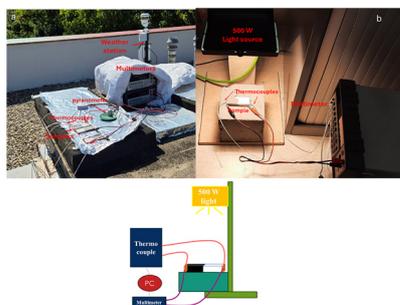
10750



### Stretch-activated morphing enabled by integrated physical–chemical network engineering

Zhao Xu, Zi-Yang Fan, Dun-Wen Wei, Rui-Ying Bao\* and Wei Yang\*

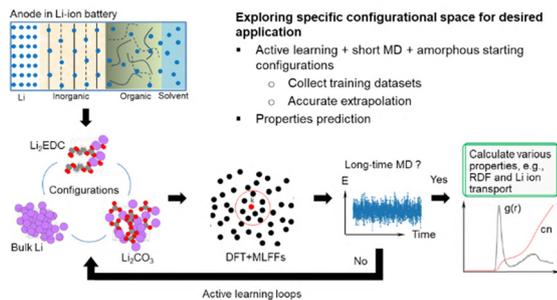
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### A chessboard-like photothermoelectric cement cell: a new design for scalable and high efficiency solar energy conversion

Mohamad Barzegar,\* Guido Goracci, Pavel Martauz and Jorge S. Dolado\*

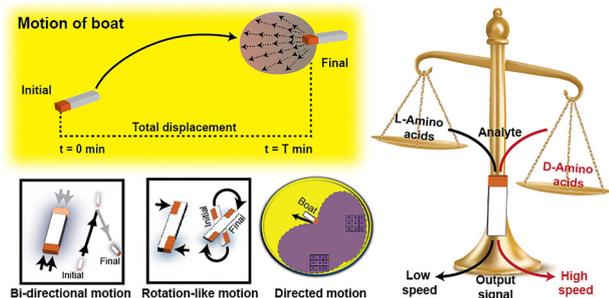
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### Enabling accurate modelling of materials for a solid electrolyte interphase in lithium-ion batteries using effective machine learning interatomic potentials

Wen-Qing Li, Gang Wu, Juan Manuel Arce-Ramos, Yang Hao Lau and Man-Fai Ng\*

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### Programmable motion of an enzyme-powered macroscale gel boat: a functional sensing platform

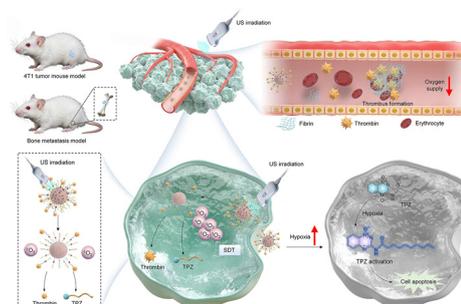
Vinay Ambekar Ranganath and Indrajit Maity\*



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### Hypoxia-amplifying polymer nanoprodrugs for sonodynamic chemotherapy for breast cancer and bone metastasis *via in situ* thrombogenesis

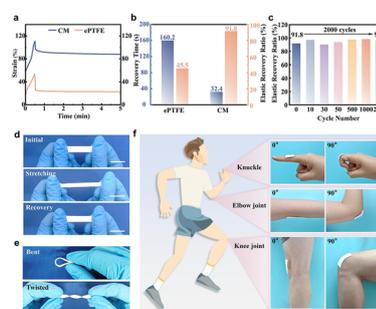
Jiayao Ding, Xing Wang, Fengshuo Wang, Wei Pan,\*  
Jingchao Li,\* Shanjin Wang\* and Yong Han\*



10806

### Highly elastic and breathable PTFE/hydrogel hierarchically compounded dressings for multi-functional protection and rapid wound healing

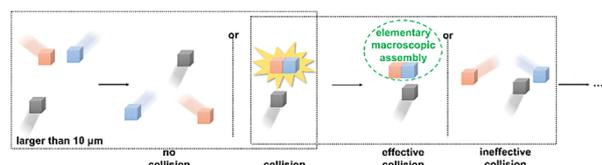
Jingxian Qin, Yanting Han, Zhe Yin, Jinhua Yang,  
Chunyang Cai, Qingong Rong, Shaoyun Guo, Ka Li\* and  
Jiabin Shen\*



10819

### Macroscopic assembly behavior of silk/lignin-based adhesive hydrogels: elementary macroscopic assembly

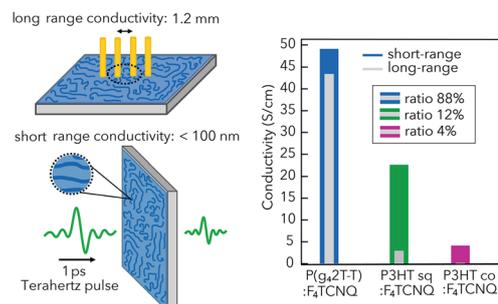
Qinfu Lu, Xinyue Wang, Miaoya Zhang, Zhen Wang,  
Xianan Qin,\* Baochang Sun\* and Shanshan Lv\*



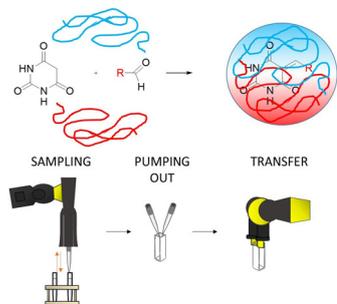
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### Distance-resilient conductivity in p-doped polythiophenes

Eva Röck, Demetra Tsokkou, Basil Hunger,  
Maximilian M. Horn, Sepideh Zokaei, Renee Kroon,  
Jesika Asatryan, Jaime Martín, Christian Müller,\*  
Martijn Kemerink\* and Natalie Banerji\*



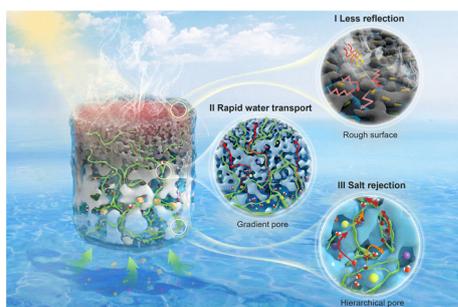
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### Smart coacervate catalysis: robotic optimization of Knoevenagel reaction networks

Anna S. Nebalueva, Danila V. Ermolin, Alexandra P. Dergacheva, Alexander S. Novikov, Alexander A. Nikolaev, Bogdan S. Vahrushev, Artemii M. Zenkin, Igor S. Pantyukhin, Alexandr A. Semenov, Aleksei V. Meshkov, Anton A. Muravev,\* Daria V. Andreeva\* and Ekaterina V. Skorb\*

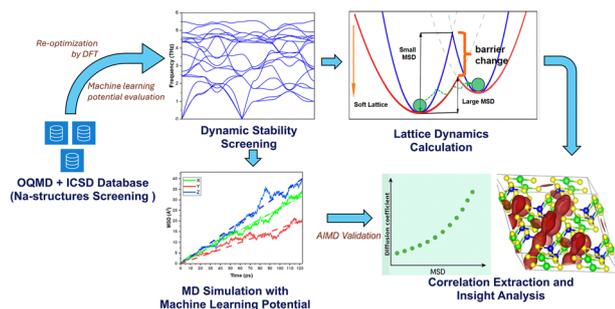
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### A biomimetic-inspired cross-scale hydrogel evaporator with synergetic light–heat–water–salt management for highly efficient and stable brine evaporation

Yifei Gong, Yiju Li, Junjie Chen,\* Shukang Yang, Yunjing Shao, Dequn Wu, Xueli Wang, Jianyong Yu, Tingting Gao\* and Faxue Li\*

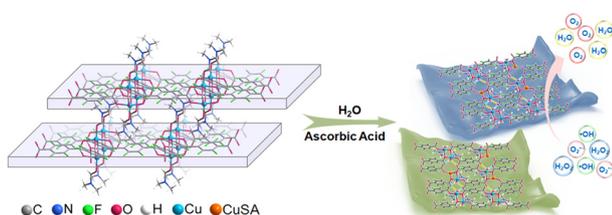
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### Machine-learning-assisted discovery of lattice dynamics signatures of sodium superionic conductors

Oghenyoma Aghoghovbia, Riccardo Rurali, Mohammed Al-Fahdi, Joshua Ojih, De-En Jiang and Ming Hu\*

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### Synthesis of single-atom catalysts with reactive oxygen species-scavenging activity via the dynamic crystal structure transition of coordination polymers

Suo-Su Wei, Shengfeng Zhang, Zhong Xu, Chen Liao, Yong-Biao Wei, Chun-Xia Deng,\* Jian Song\* and Jin Huang\*

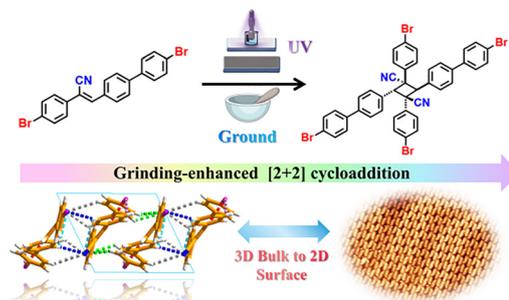


## COMMUNICATIONS

10891

### Mechanochemical grinding-enhanced olefin–olefin [2+2] cycloaddition in cyanostilbene derivatives: mechanistic dependence on halogen-based bonding

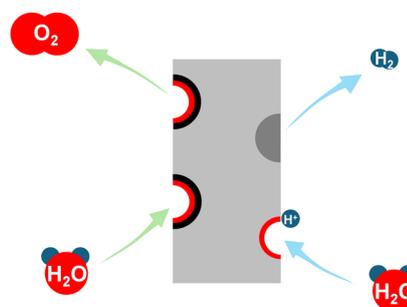
Xiaoyang Zhao, Zifeng Huang, Xiaohua Liu and Xinrui Miao\*



10901

### Dynamic Mo leaching and vacancy engineering synergize HER and OER kinetics in NiFe-based catalysts for overall water electrolysis

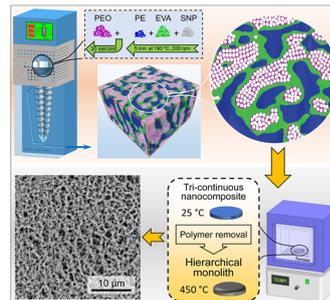
Wendi Zhang, Yuxuan Xiao, Lun Li, Zhichao Yu, Jinxian Feng, Chengcheng Zhong, Weng Fai Ip and Hui Pan\*



10911

### Tri-continuous polymer templates enable scalable fabrication of hierarchical nanoparticle monoliths

Aylin Habibiyan, Shohei Yoshida, Rajas Sudhir Shah and Milana Trifkovic\*



## CORRECTION

10920

### Correction: An immunological electrospun scaffold for tumor cell killing and healthy tissue regeneration

Xingzhi Liu, Hongbo Zhang, Ruoyu Cheng, Yanzheng Gu, Yin Yin, Zhiyong Sun, Guoqing Pan, Zhongbin Deng, Huilin Yang, Lianfu Deng, Wenguo Cui,\* Hélder A. Santos\* and Qin Shi\*

