

# 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 10(12) 5317-5986 (2023)



### Cover

See Wei Tao, Tiangang Luan, Seyoung Koo, Xiaoyuan Ji *et al.*, pp. 5474–5483. Image reproduced by permission of Xiaoyuan Ji from *Mater. Horiz.*, 2023, 10, 5474.



### Inside cover

See Sandip Thakur and Ashutosh Giri, pp. 5484–5491. Image reproduced by permission of Ashutosh Giri from *Mater. Horiz.*, 2023, 10, 5484.

## EDITORIAL

5335

**Materials Horizons Emerging Investigator Series:**  
**Dr Shanshan Yao, Stony Brook University, USA**

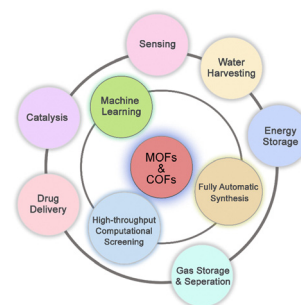


## OPINIONS

5337

**The future of metal–organic frameworks and covalent organic frameworks: rational synthesis and customized applications**

Xing Han, Wenqiang Zhang, Zhijie Chen,\* Yan Liu\* and Yong Cui\*



## Editorial Staff

### Executive Editor

Michaela Mühlberg

### Deputy Editor

Geraldine Hay

### Editorial Production Manager

Jonathon Watson

### Senior Publishing Editor

Alex Metherell

### Development Editor

Rose Wedgbury

### Publishing Editors

Matthew Blow, Chris Dias, Hemma Fathima, Rob Hinde, Ash Hyde, Evie Karkera, Tamara Kosikova, Carole Martin, Kirsty McRoberts, Tiffany Rogers, Cat Schofield, Tom Williams

### Editorial Assistant

Daniel Smith

### Publisher

Sam Keltie

For queries about submitted papers, please contact Jonathon Watson, Editorial Production Manager in the first instance. E-mail: [materialshorizons@rsc.org](mailto:materialshorizons@rsc.org)

For pre-submission queries please contact Michaela Mühlberg, Executive Editor. E-mail: [materialshorizons-rsc@rsc.org](mailto:materialshorizons-rsc@rsc.org)

Materials Horizons (electronic: ISSN 2051-6355) is published 12 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to the Royal Society of Chemistry Order Department, Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK. Tel +44 (0)1223 432398; E-mail [orders@rsc.org](mailto:orders@rsc.org)

2023 Annual (electronic) subscription price: £2697, \$4615. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at [www.rsc.org/ip](http://www.rsc.org/ip)

Customers should make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank.

Whilst this material has been produced with all due care, the Royal Society of Chemistry cannot be held responsible or liable for its accuracy and completeness, nor for any consequences arising from any errors or the use of the information contained in this publication. The publication of advertisements does not constitute any endorsement by the Royal Society of Chemistry or Authors of any products advertised. The views and opinions advanced by contributors do not necessarily reflect those of the Royal Society of Chemistry which shall not be liable for any resulting loss or damage arising as a result of reliance upon this material. The Royal Society of Chemistry is a charity, registered in England and Wales, Number 207890, and a company incorporated in England by Royal Charter (Registered No. RC000524), registered office: Burlington House, Piccadilly, London W1J 0BA, UK, Telephone: +44 (0) 207 4378 6556.

### Advertisement sales:

Tel +44 (0) 1223 432246; Fax +44 (0) 1223 426017; E-mail [advertising@rsc.org](mailto:advertising@rsc.org)

For marketing opportunities relating to this journal, contact [marketing@rsc.org](mailto:marketing@rsc.org)

# Materials Horizons

[rsc.li/materials-horizons](http://rsc.li/materials-horizons)

Building and designing systems from the molecular level

## Editorial Board

### Chair

Martina Stenzel, University of New South Wales, Australia

### Scientific Editors

Jean-Luc Bredas, University of Arizona, USA  
Bruno Chaudret, INSA, France  
Guoping Chen, National Institute for Materials Science, Japan

Yong Cui, Shanghai Jiao Tong University, China  
Simone Fabiano, Linköping University, Sweden  
Zhongyi Jiang, Tianjin University, China  
Kisuk Kang, Seoul National University, South Korea  
Norbert Kock, Humboldt University of Berlin, Germany  
Róisín Owens, University of Cambridge, United Kingdom

Yi Long, Chinese University of Hong Kong, Hong Kong SAR, China

### Members

Kelsey Hatzell, Princeton University, USA  
Mark E. Thompson, University of Southern California, USA  
Shu Yang, University of Pennsylvania, USA

## Advisory Board

Athina Anastasaki, ETH Zurich, Switzerland  
Markus Antonietti, Max Planck Institute of Colloids & Interfaces, Germany  
David Beljonne, University of Mons, Belgium  
Chris Bettinger, Carnegie Mellon University, USA  
Kanishka Biswas, Jawaharlal Nehru Centre for Advanced Scientific Research, India  
Paul Blom, Max Planck Institute for Polymer Research, Mainz, Germany  
Mischa Bonn, Max Planck Institute for Polymer Research, Germany  
Markus Buehler, Massachusetts Institute of Technology, USA  
Jillian Buriak, University of Alberta, Canada  
Moyuan Cao, Nankai University, China  
Yong Cao, South China University of Technology, China  
Rachel Caruso, University of Melbourne, Australia  
Anthony Cheetham, University of Cambridge, UK  
Hong Chen, Soochow University, China  
Paulette Clancy, Johns Hopkins University, USA  
Brandi Cossairt, University of Washington, USA  
Dibyendu Das, IISER Kolkata, India  
Luisa De Cola, University of Strasbourg, France  
Ulrike Diebold, Vienna University of Technology, Austria  
Mircea Dinca, Massachusetts Institute of Technology, USA  
Gitti Frey, Technion - Israel Institute of Technology, Israel  
Richard Friend, University of Cambridge, UK  
Subi George, Jawaharlal Nehru Centre for Advanced Scientific Research, India  
Rebecca Gieseking, Brandeis University  
Jian Ping Gong, Hokkaido University, Japan  
Grace Gu, University of California, Berkeley, USA  
Ritu Gupta, Indian Institute of Technology Jodhpur, India  
David Haddleton, University of Warwick, UK  
Martin Heene, King Abdullah University of Science and Technology (KAUST), Saudi Arabia  
Laura Herz, University of Oxford, UK  
Jurriaan Huskens, University of Twente, Netherlands  
Hiroshi Imahori, Kyoto University, Japan

Lei Jiang, Beihang University, China  
Antoine Kahn, Princeton University, USA  
Richard Kaner, University of California, Los Angeles, USA  
Susumu Kitagawa, Kyoto University, Japan  
Anna Koehler, University of Bayreuth, Germany  
Frederik Krebs, Elite Science, Denmark  
Katharina Landfester, Max Planck Institute for Polymer Research, Germany  
Guglielmo Lanzani, Italian Institute of Technology, Italy  
Neng Li, Wuhan University of Technology, China  
Yan Li, Peking University, China  
Darren Lipomi, University of California, San Diego, USA  
Bin Liu, National University of Singapore, Singapore  
Maria Antonietta Loi, University of Groningen, Netherlands  
Lynn Yueh Lin Loo, Princeton University, USA  
Bettina Lotsch, Max Planck Institute for Solid State Research, Germany  
HongYee Low, Singapore University of Technology and Design, Singapore  
Eva Malmström Jonsson, KTH Royal Institute of Technology, Sweden  
Uttam Manna, Indian Institute of Technology-Guwahati, India  
Seth Marder, University of Colorado Boulder, USA  
Richard Martel, University of Montreal, Canada  
Hedi Mattoussi, Florida State University, USA  
David Meecerreyes, University of the Basque Country, Spain  
Phillip Messersmith, University of California, Berkeley, USA  
Catherine Murphy, University of Illinois Urbana-Champaign, USA  
K S Narayan, Jawaharlal Nehru Centre for Advanced Scientific Research, India  
Thuc-Quyen Nguyen, University of California, Santa Barbara, USA  
Markus Niederberger, ETH Zürich, Switzerland  
Teri Odom, Northwestern University, USA  
Wee-Jun Ong, Xiamen University, Malaysia  
Moon Jeong Park, Pohang University of Science and Technology (POSTECH), Korea  
Marie-Paule Pileni, Pierre and Marie Curie University, France  
Vivek Polshettiwar, Tata Institute of Fundamental Research (TIFR), India  
C N R Rao, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India  
Erin Ratcliff, University of Arizona, USA  
Vince Rotello, University of Massachusetts at Amherst, USA  
David Scanlon, University College London, United Kingdom  
Bernd M. Schmidt, Heinrich Heine University Düsseldorf, Germany  
Christine Schmidt, University of Florida, USA  
Gregory D. Scholes, Princeton University, USA  
Rachel Segalman, University of California Santa Barbara, USA  
Peter Skabara, University of Glasgow, UK  
Henry Snith, University of Oxford, UK  
Kazuo Takimaya, RIKEN, Japan  
Luca Torsi, University of Bari, Italy  
Ramanathan Vaidyanathan, IISER Pune, India  
Aleks Vojvodic, University of Pennsylvania, USA  
Elizabeth von Hauff, VU Amsterdam, The Netherlands  
Aron Walsh, Imperial College London, UK  
Mengye Wang, Sun Yat-Sen University, China  
Shu Wang, Institute of Chemistry, Chinese Academy of Sciences, China  
Xun Wang, Tsinghua University, China  
Tanja Weil, Max Planck Institute for Polymer Research, Germany  
Emily Weiss, Northwestern University, USA  
David Weitz, Harvard University, USA  
Chris Wolverson, Northwestern University, USA  
Yi Xie, University of Science and Technology of China, China  
Vivian Wing-Wah Yam, University of Hong Kong, Hong Kong  
Shannon Yee, Georgia Institute of Technology, USA  
Jihong Yu, Jilin University, China  
Shu-Hong Yu, University of Science and Technology of China, China  
Aldo J. G. Zarbin, Universidade Federal do Paraná, Brazil  
Xiaowei Zhan, Peking University, China  
Nan Zhang, Hunan University, China  
Dongyuan Zhao, Fudan University, China  
Ye Zhou, Shenzhen University, China

## Community Board

Please see the Materials Horizons journal webpage for full details of our Community Board: [rsc.li/materials-horizons](http://rsc.li/materials-horizons)

## Information for Authors

Full details on how to submit material for publication in Materials Horizons are given in the Instructions for Authors (available from <http://www.rsc.org/authors>). Submissions should be made via the journal's homepage: [rsc.li/materials-horizons](http://rsc.li/materials-horizons). Submissions: The journal welcomes submissions of manuscripts for publication as Communications, Reviews, Mini-reviews and Focus Articles. Communications should contain exceptionally significant scientific work of such importance that rapid publication is desirable. The research presented should provide new insight into the topic and be accessible to the broad readership of the journal.

Colour figures are reproduced free of charge. Additional details are available from the Editorial Office or <http://www.rsc.org/authors>. Authors may reproduce/republish portions of their published contribution without seeking permission from the Royal Society of

Chemistry, provided that any such republication is accompanied by an acknowledgement in the form: (Original Citation)–Reproduced by permission of the Royal Society of Chemistry.

This journal is © The Royal Society of Chemistry 2023. Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication may only be reproduced, stored or transmitted, in any form or by any means, with the prior permission in writing of the Publishers or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency in the UK. US copyright law is applicable to users in the USA.

Registered charity number: 207890

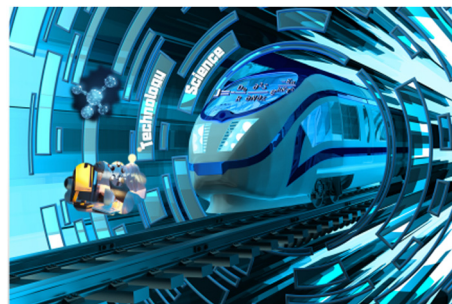


## OPINIONS

5343

### Prediction of future breakthroughs in materials synthesis and manufacturing techniques: a new perspective of synthesis dynamics theory

Zeshuo Meng, Zijin Xu, Zhengyan Du, Ting Deng, Dong Wang, Yi Zeng, Shansheng Yu, Xiaoying Hu\* and Hongwei Tian\*

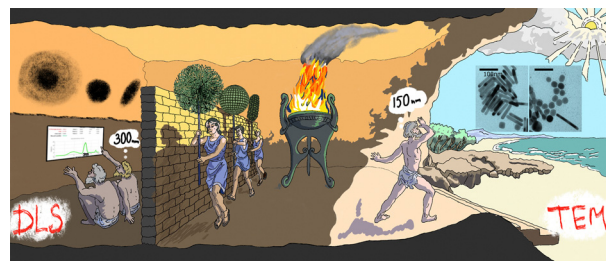


## FOCUS

5354

### Dynamic light scattering and transmission electron microscopy in drug delivery: a roadmap for correct characterization of nanoparticles and interpretation of results

Sergey K. Filippov,\* Ramil Khusnutdinov, Anastasiia Murmiliuk, Wali Inam, Lucia Ya. Zakharova, Hongbo Zhang and Vitaliy V. Khutoryanskiy

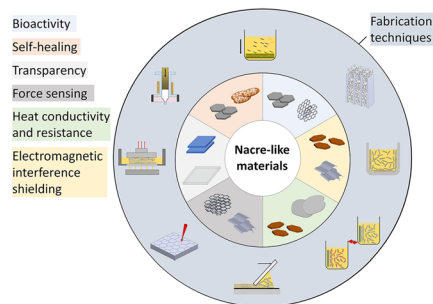


## REVIEWS

5371

### Multifunctional nacre-like materials

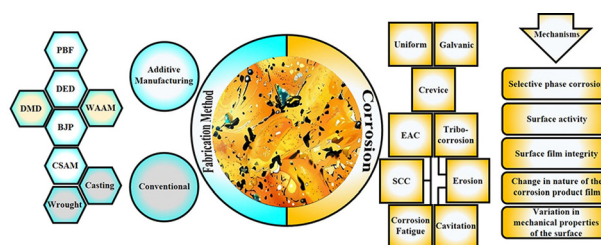
Zizhen Ding, Travis Klein, Christopher Barner-Kowollik and Mohammad Mirkhalaf\*



5391

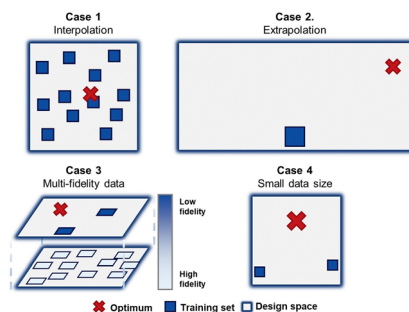
### A review of the corrosion behavior of conventional and additively manufactured nickel–aluminum bronze (NAB) alloys: current status and future challenges

Khashayar Morshed-Behbahani,\* Donald Paul Bishop and Ali Nasiri\*



## REVIEWS

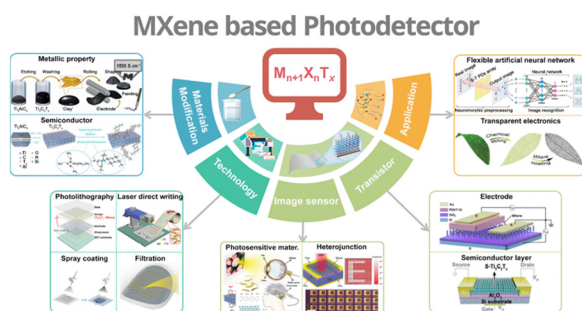
5436



### Machine learning-based inverse design methods considering data characteristics and design space size in materials design and manufacturing: a review

Junhyeong Lee, Donggeun Park, Mingyu Lee, Hugon Lee, Kundo Park, Ikjin Lee and Seunghwa Ryu\*

5457

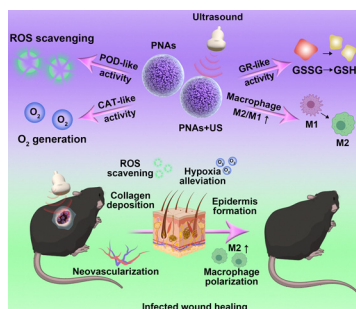


### MXene based flexible photodetectors: progress, challenges, and opportunities

La Li and Guozhen Shen\*

## COMMUNICATIONS

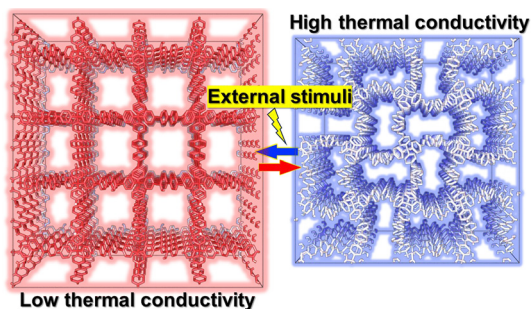
5474



### Infected wound repair with an ultrasound-enhanced nanozyme hydrogel scaffold

Fan Zhang, Yong Kang, Liwen Feng, Guan Xi, Wei Chen, Na Kong, Wei Tao,\* Tiangang Luan,\* Seyoung Koo\* and Xiaoyuan Ji\*

5484



### Reversible and high-contrast thermal conductivity switching in a flexible covalent organic framework possessing negative Poisson's ratio

Sandip Thakur and Ashutosh Giri\*

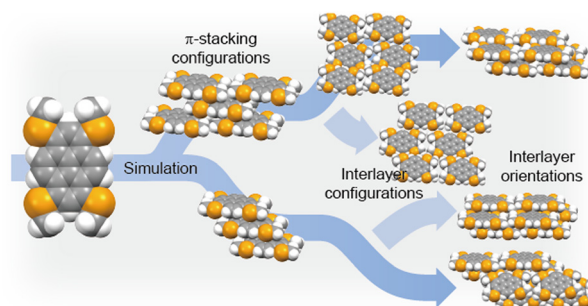




5492

### Crystal-structure simulation of molecular semiconductors: brickwork-related crystal structures of methylthiolated *peri*-condensed polycyclic aromatic hydrocarbons

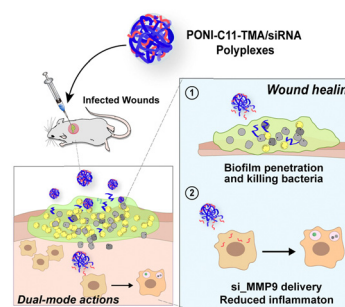
Kirill Bulgarevich and Kazuo Takimiya\*



5500

### Antimicrobial polymer-siRNA polyplexes as a dual-mode platform for the treatment of wound biofilm infections

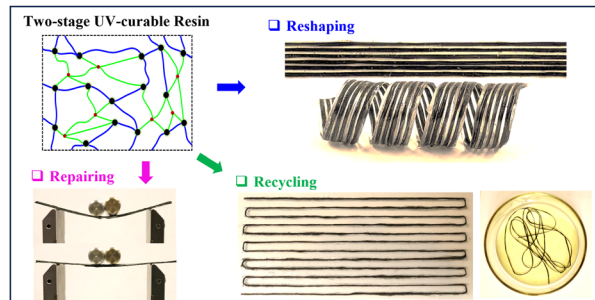
Taewon Jeon, Jessa Marie V. Makabenta, Jungmi Park, Ahmed Nabawy, Yagiz Anil Cicek, Sarah S. Mirza, Janelle Welton, Muhammad Aamir Hassan, Rui Huang, Jesse Mager and Vincent M. Rotello\*



5508

### 3D Printing of continuous fiber composites using two-stage UV curable resin

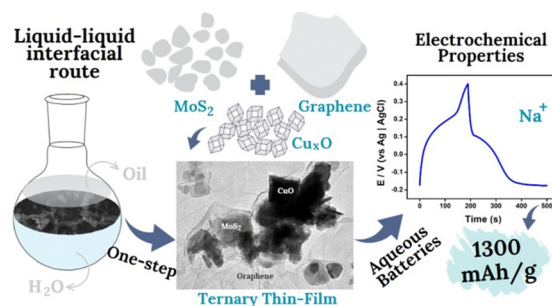
Huan Jiang, Arif M. Abdullah, Yuchen Ding, Christopher Chung, Martin L. Dunn\* and Kai Yu\*



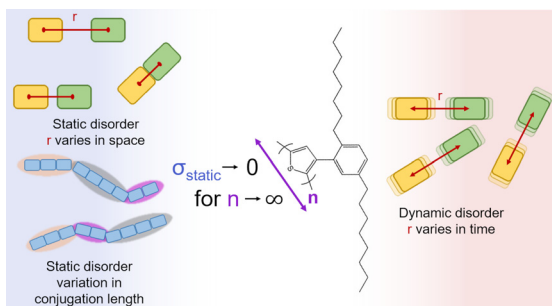
5521

### Nanoarchitected graphene/copper oxide nanoparticles/MoS<sub>2</sub> ternary thin films as highly efficient electrodes for aqueous sodium-ion batteries

Maria K. Ramos, Gustavo Martins, Luiz H. Marcolino-Junior, Márcio F. Bergamini, Marcela M. Oliveira and Aldo J. G. Zarbin\*



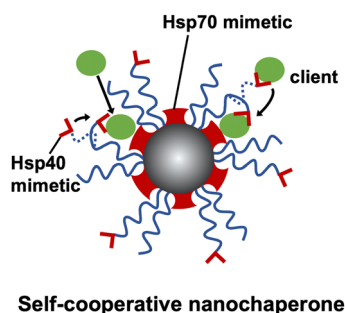
5538



### A spectroscopic assessment of static and dynamic disorder in a film of a polythiophene with a planarized backbone

Konstantin Schötz, Fabian Panzer, Michael Sommer, Heinz Bässler and Anna Köhler\*

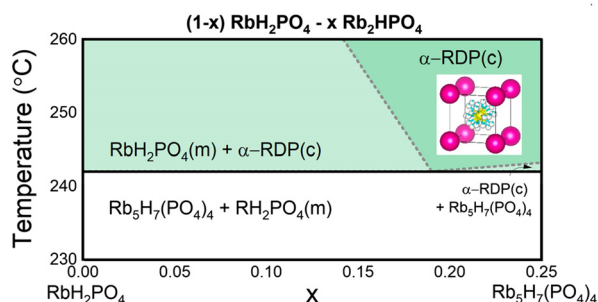
5547



### Development of self-cooperative nanochaperones with enhanced activity to facilitate protein refolding

Menglin Yang, Yanli Zhang, Fei Deng, Xiaohui Wu, Yujie Chen, Feihe Ma\* and Linqi Shi\*

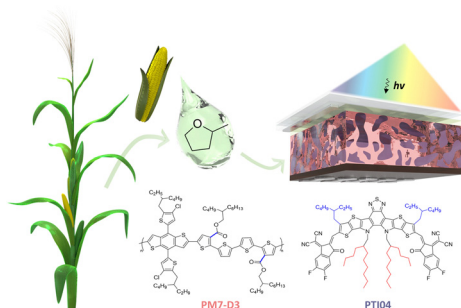
5555



### Superprotonic conductivity in $\text{RbH}_{2-3y}(\text{PO}_4)_{1-y}$ : a phosphate deficient analog to cubic $\text{CsH}_2\text{PO}_4$ in the $(1-x)\text{RbH}_2\text{PO}_4 - x\text{Rb}_2\text{HPO}_4$ system

Grace Xiong, Louis S. Wang and Sossina M. Haile\*

5564



### Additive-free molecular acceptor organic solar cells processed from a biorenewable solvent approaching 15% efficiency

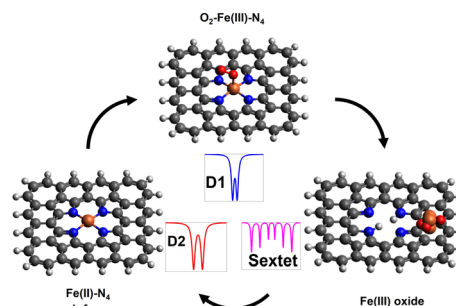
Zhifang Du, Hoang Mai Luong, Sina Sabury, Pattarawadee Therdkatanyuphong, Sangmin Chae, Claire Welton, Austin L. Jones, Junxiang Zhang, Zhengxing Peng, Ziyue Zhu, Sadisha Nanayakkara, Veaceslav Coropceanu, Dylan G. Choi, Steven Xiao, Ahra Yi, Hyo Jung Kim, Jean-Luc Bredas, Harald Ade, G. N. Manjunatha Reddy,\* Seth R. Marder,\* John R. Reynolds\* and Thuc-Quyen Nguyen\*



5577

### Life cycle of single atom catalysts: a Mössbauer study on degradation and reactivation of tetrapyrrolic Fe–N–C powders

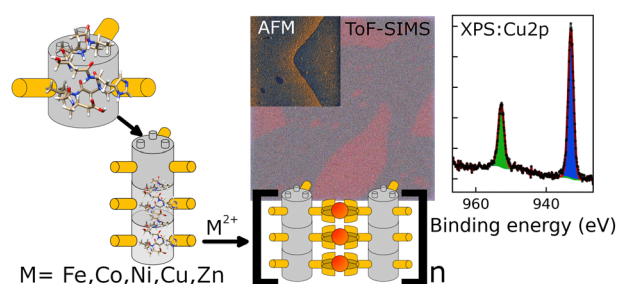
Davide Menga, Friedrich E. Wagner and Tim-Patrick Fellingner\*



5584

### Controllable hierarchical self-assembly: systematic study forming metallosupramolecular frameworks on the basis of helical beta-oligoamides

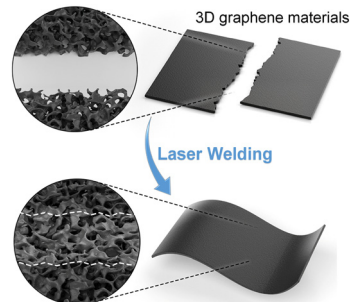
Norton G. West,\* Sarah E. Bamford, Paul J. Pigram, Jisheng Pan,\* Dong-Chen Qi and Adam Mechler\*



5597

### Pulsed laser welding of macroscopic 3D graphene materials

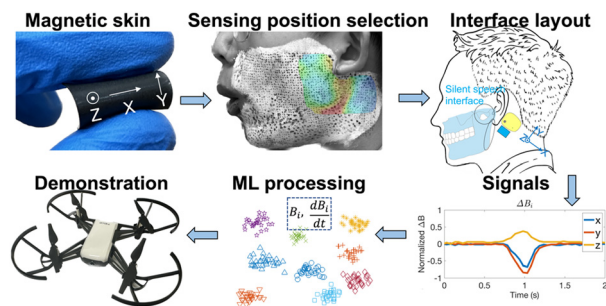
Wenjie Yu, Weiwei Zhao and Xiaoqing Liu\*



5607

### Decoding silent speech commands from articulatory movements through soft magnetic skin and machine learning

Penghao Dong, Yizong Li, Si Chen, Justin T. Grafstein, Irfaan Khan and Shanshan Yao\*



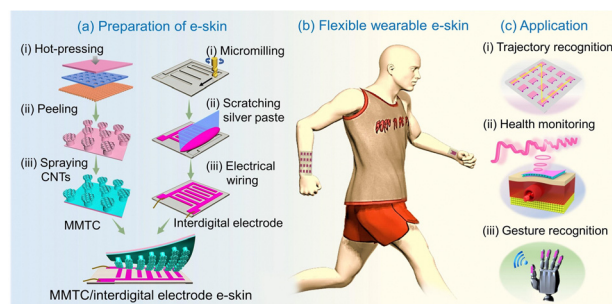




5666

### Mushroom-mimetic 3D hierarchical architecture-based e-skin with high sensitivity and a wide sensing range for intelligent perception

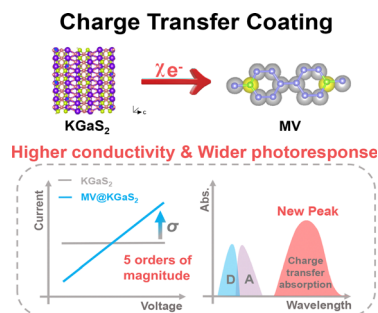
Yajie Zhang, Xinyu Zhang, Chuan Ning, Kun Dai, Guoqiang Zheng,\* Chuntai Liu and Changyu Shen



5677

### Significant increase of the photoresponse range and conductivity for a chalcogenide semiconductor by viologen coating through charge transfer

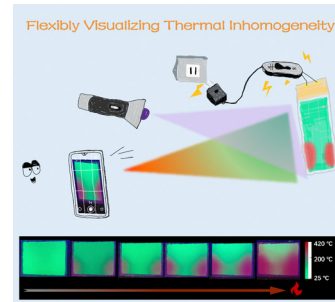
Tian-Tian Song, Wei-Qiang Huang, Kai-Bin Jiang, Wen-Fa Chen, Yu Zhou, Hong-Yi Bian, Ming-Sheng Wang\* and Guo-Cong Guo\*



5684

### Visualizing temperature inhomogeneity using thermo-responsive smart materials

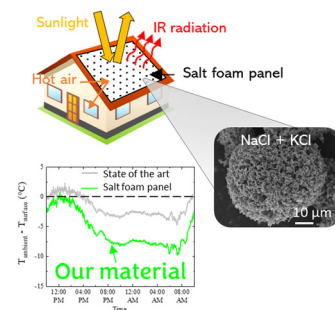
Panqin Wang, Jiaren Du,\* Tengyue Wang, Shaoxing Lyu, Rik Van Deun, Dirk Poelman and Hengwei Lin\*



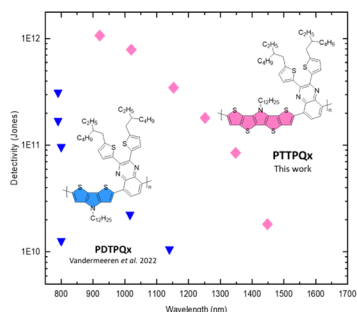
5694

### All-day passive radiative cooling using common salts

Mariana Desirée Reale Batista, Alyssa L. Troksa, Hannah V. Eshelman, Michael Bagge-Hansen and John D. Roehling\*



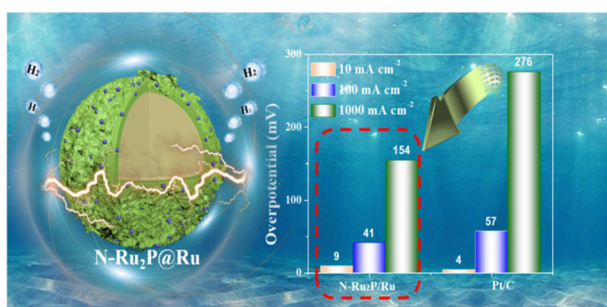
5704



### A tetrathienopyrrole-based ladder-type donor polymer for high-performance organic near-infrared cavity detectors

Kaat Valkeneers, Jorne Raymakers, Quan Liu,\*  
Jochen Vanderspikken, Yuming Wang, Jurgen Kesters,  
Tyler James Quill, Zhen Liu, Niko Van den Brande,  
Laurence Lutsen, Koen Vandewal\* and Wouter Maes\*

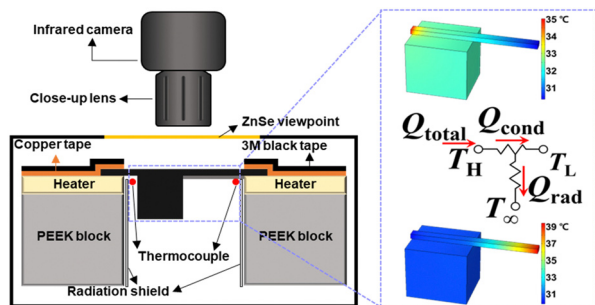
5712



### Developing energy-efficient N-doping technology to controllably construct N-Ru<sub>2</sub>P@Ru nanospheres for highly efficient hydrogen evolution at an ampere-level current density

Mengmeng Wang, Yunmei Du,\* Shuangshuang Li,  
Xiaoli Sun, Bin Li, Yuanxiang Gu and Lei Wang\*

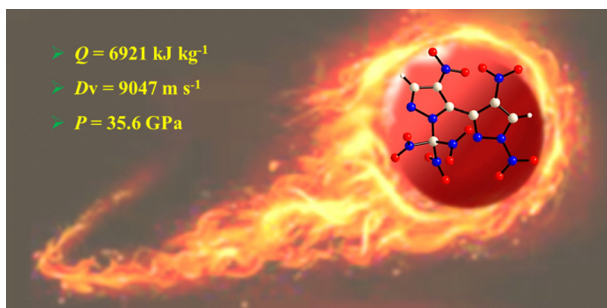
5720



### Giant thermal rectification efficiency by geometrically enhanced asymmetric non-linear radiation

Seongkyun Kim, Taeyeop Kim, Jaehyun Sung,  
Yongjun Kim, Dongwoo Lee\* and Seunghyun Baik\*

5729



### Pushing the limits of the heat of detonation via the construction of polynitro bipyrazole

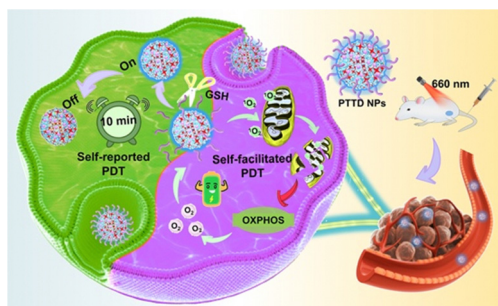
Yaqun Dong, Miao Li, Jing Liu, Yuji Liu, Wei Huang,  
Jean'ne M. Shreeve and Yongxing Tang\*



5734

### Self-reported and self-facilitated theranostic oxygen nano-economizer for precise and hypoxia alleviation-potentiated photodynamic therapy

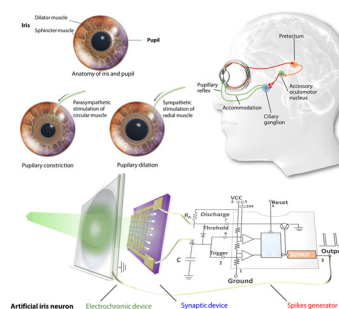
Shumeng Li, Fujun Yang, Yongdan Wang, Linshan Jia and Xiaohong Hou\*



5753

### A retinomorphonic neuron for artificial vision and iris accommodation

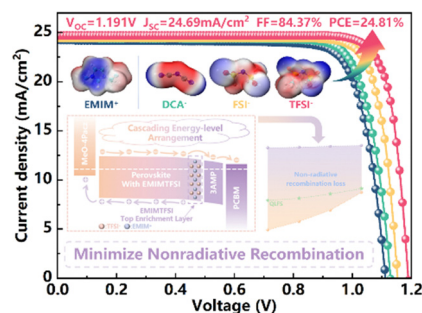
Lin Sun, Shangda Qu and Wentao Xu\*



5763

### In situ dipole formation to achieve high open-circuit voltage in inverted perovskite solar cells via fluorinated pseudohalide engineering

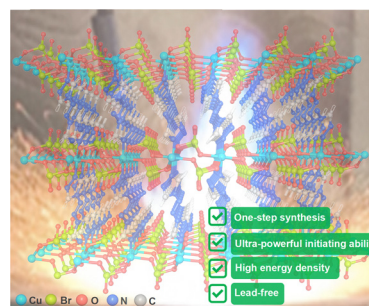
Yuan Liu, Chen Tang, Anxin Sun, Rongshan Zhuang, Yiting Zheng, Congcong Tian, Xueyun Wu, Zihao Li, Beilin Ouyang, Jiajun Du, Ziyi Li, Yong Hua and Chun-Chao Chen\*



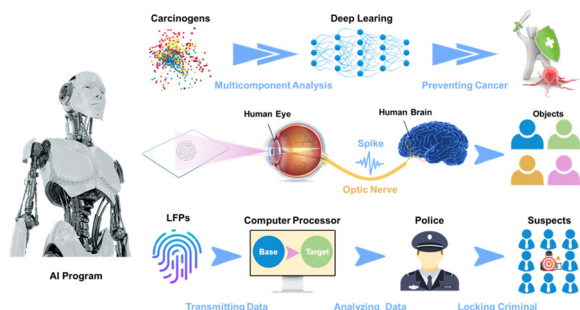
5775

### A three-dimensional energetic coordination compound (BLG-1) with excellent initiating ability for lead-free primary explosives

Guorong Lei, Wenchuan Cheng, Zujia Lu, Tonglai Zhang, Zhimin Li\* and Jianguo Zhang\*



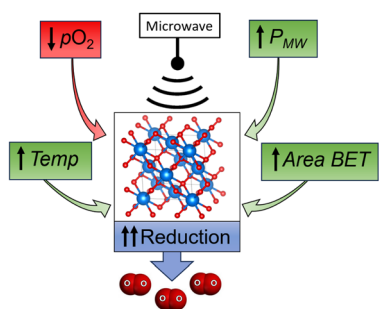
5782



## Multifunctional Eu(III)-modified HOFs: roxarsone and aristolochic acid carcinogen monitoring and latent fingerprint identification based on artificial intelligence

Kai Zhu and Bing Yan\*

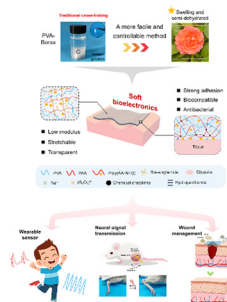
5796



## Modulating redox properties of solid-state ion-conducting materials using microwave irradiation

J. M. Serra,\* M. Balaguer, J. Santos-Blasco, J. F. Borrás-Morell, B. García-Baños, P. Plaza-Gonzalez, D. Catalán-Martínez, F. Penaranda-Foix, A. Domínguez, L. Navarrete and J. M. Catala-Civera\*

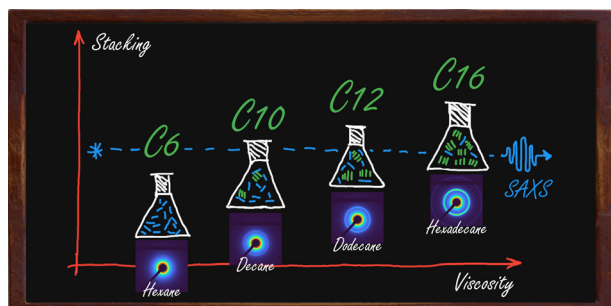
5805



## Conductive and antibacterial dual-network hydrogel for soft bioelectronics

Huiqi Sun, Sai Wang, Fan Yang, Mingyi Tan, Ling Bai, Peipei Wang, Yingying Feng, Wenbo Liu, Rongguo Wang\* and Xiaodong He

5822



## Self-assembly of perovskite nanoplates in colloidal suspensions

Raphael F. Moral, Antônio A. Malfatti-Gasperini, Luiz G. Bonato, Brenner R. C. Vale, André F. V. Fonseca, Lazaro A. Padilha, Cristiano L. P. Oliveira and Ana F. Nogueira\*

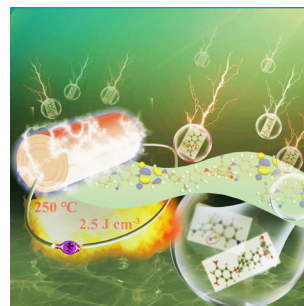




5835

### Intrinsic-designed polyimide dielectric materials with large energy storage density and discharge efficiency at harsh ultra-high temperatures

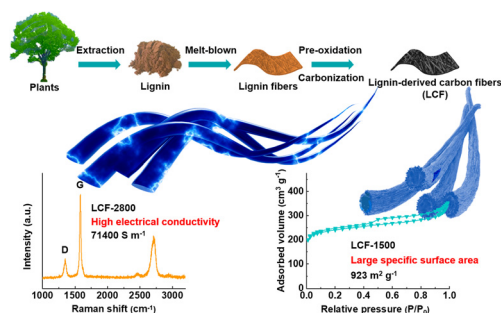
Yaya Tian, Ming-Sheng Zheng,\* Yuchao Li,\* Chuqi Xu, Yiyi Zhang, Wei Liu, Zhi-Min Dang and Jun-Wei Zha\*



5847

### Highly conductive and porous lignin-derived carbon fibers

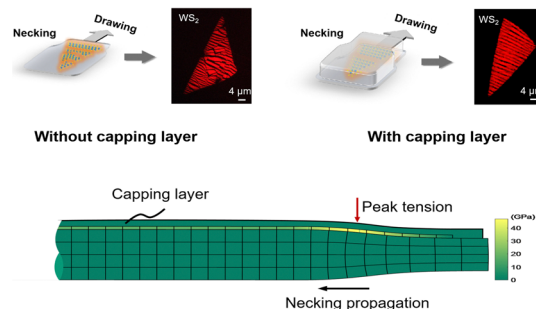
Guosheng Jia, Yan Yu, Xuefen Wang, Chao Jia,\* Zexu Hu, Senlong Yu, Hengxue Xiang\* and Meifang Zhu



5859

### Capping layer enabled controlled fragmentation of two-dimensional materials by cold drawing

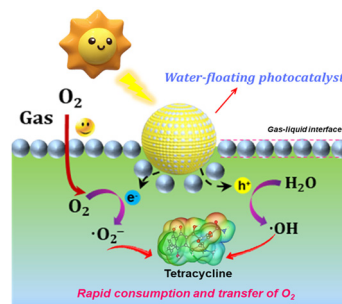
Ming Chen,\* Dong Li, Yuxin Hou, Mengxi Gu, Qingsheng Zeng, De Ning, Weimin Li, Xue Zheng, Yan Shao, Zhixun Wang,\* Juan Xia, Chunlei Yang,\* Lei Wei\* and Huajian Gao\*



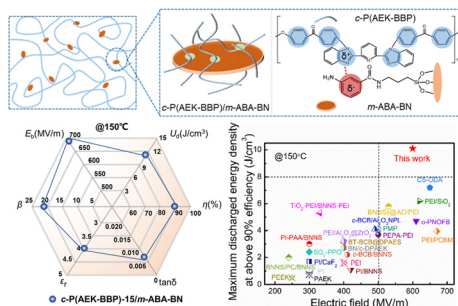
5869

### Fabrication of water-floating litchi-like polystyrene-sphere-supported TiO<sub>2</sub>/Bi<sub>2</sub>O<sub>3</sub> S-scheme heterojunction for efficient photocatalytic degradation of tetracycline

Wensheng Zhang, Qingmei Tan, Tianren Liu, Ying He, Gang Chen, Ke Chen, Dongxue Han,\* Dongdong Qin and Li Niu\*



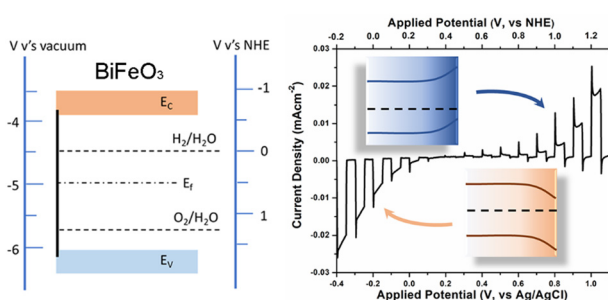
5881



### Superior high-temperature capacitive performance of polyaryl ether ketone copolymer composites enabled by interfacial engineered charge traps

Xinyi Li, Yunchuan Xie, Jie Xiong, Bofeng Zhu, Xiao Zhang,\* Xinhua Duan, Bo Dong\* and Zhicheng Zhang\*

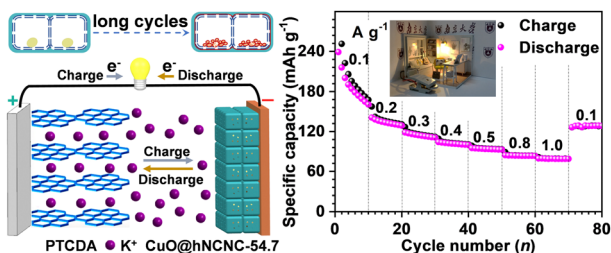
5892



### Origin of the switchable photocurrent direction in BiFeO<sub>3</sub> thin films

Yaqiong Wang, Matyas Daboczi, Man Zhang, Joe Briscoe, Ji-Seon Kim, Haixue Yan\* and Steve Dunn\*

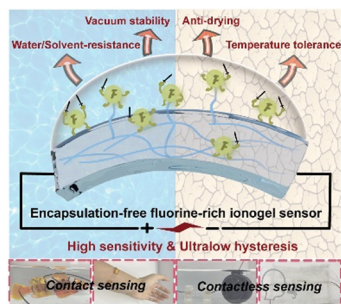
5898



### Loss-free pulverization by confining copper oxide inside hierarchical nitrogen-doped carbon nanocages toward superb potassium-ion batteries

Guanghai Chen, Jia Liu, Shenglan Ma, Changkai Zhou, Jietao Jiang, Zhen Shen, Lijie Yan, Yue Guo, Lijun Yang, Qiang Wu,\* Xizhang Wang\* and Zheng Hu\*

5907



### High-sensitivity and ultralow-hysteresis fluorine-rich ionogel strain sensors for multi-environment contact and contactless sensing

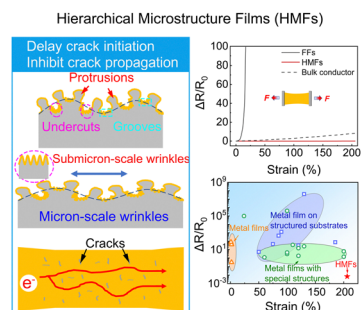
Faqi Hu, Zhenkai Huang, Chuan Luo and Kan Yue\*



5920

## Highly stable and strain-insensitive metal film conductors *via* manipulating strain distribution

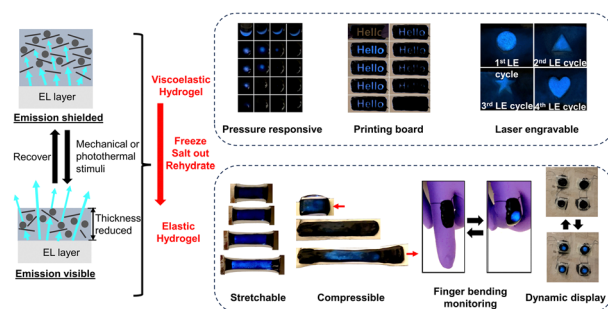
Ting Zhu, Kai Wu,\* Yaqiang Wang, Jinyu Zhang, Gang Liu\* and Jun Sun\*



5931

## Interactive deformable electroluminescent devices enabled by an adaptable hydrogel system with optical/photothermal/mechanical tunability

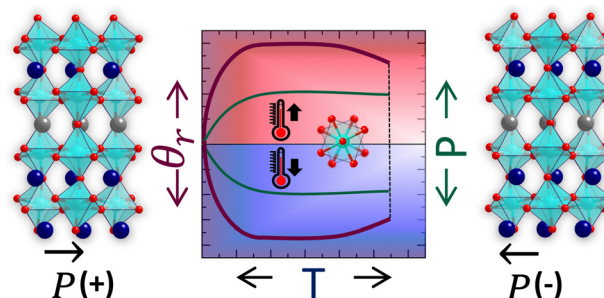
Zaili Hou, Songshan Zeng,\* Kuangyu Shen, Patrick R. Healey, Holly J. Schipper, Luqi Zhang, Miranda Zhang, Michael D. Jones and Luyi Sun\*



5942

## Design of high polarization low switching barrier hybrid improper ferroelectric perovskite oxide superlattices

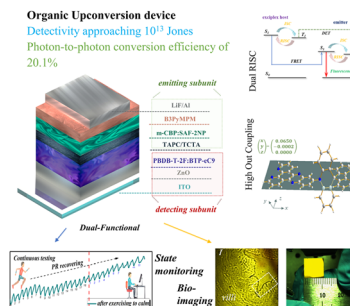
M. J. Swamynadhan, Ayana Ghosh and Saurabh Ghosh\*



5950

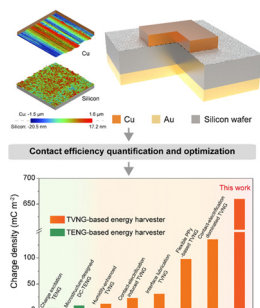
## A high-performance dual-functional organic upconversion device with detectivity approaching $10^{13}$ Jones and photon-to-photon efficiency over 20%

Zeyu He, Heng-yuan Zhang, Xiaoyang Du,\* Xin Yu, Jiayue Han, Luye Cao, Hui Lin, Jun Wang, Caijun Zheng and Silu Tao\*



## COMMUNICATIONS

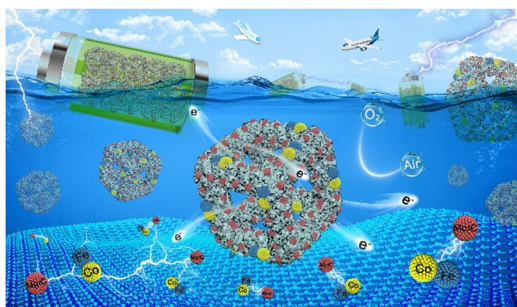
5962



### Contact efficiency optimization for tribovoltaic nanogenerators

Zhihao Zhao, Jiayue Zhang, Wenyan Qiao, Linglin Zhou, Ziting Guo, Xinyuan Li, Zhong Lin Wang\* and Jie Wang\*

5969



### A macroporous carbon nanoframe for hosting Mott-Schottky Fe-Co/Mo<sub>2</sub>C sites as an outstanding bi-functional oxygen electrocatalyst

Jie Hong, Lei Zhang,\* Qiliang Zhu, Ziang Du, Yingtang Zhou,\* Thomas Wågberg and Guangzhi Hu\*

## CORRECTIONS

5983

### Correction: A wearable colorimetric sweat pH sensor-based smart textile for health state diagnosis

Ji-Hwan Ha, Yongrok Jeong, Junseong Ahn, Soonhyoung Hwang, Sohee Jeon, Dahong Kim, Jiwoo Ko, Byeongmin Kang, Young Jung, Jungrak Choi, Hyeonseok Han, Jimin Gu, Seokjoo Cho, Hyunjin Kim, Moonjeong Bok, Su A. Park, Jun-Ho Jeong\* and Inkyu Park\*

5984

### Correction: A super-high brightness and excellent colour quality laser-driven white light source enables miniaturized endoscopy

Shuxing Li, Linhui Huang, Yuqin Guo, Le Wang\* and Rong-Jun Xie\*

