

# Nanoscale Horizons

The home for rapid reports of exceptional significance in nanoscience and nanotechnology  
[rsc.li/nanoscale-horizons](https://rsc.li/nanoscale-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 2055-6756 CODEN NHAOAW 8(4) 415-552 (2023)



### Cover

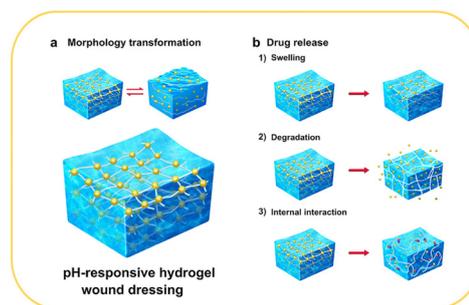
See Alberto Alvarez-Fernandez, Stefan Guldin *et al.*, pp. 460–472. Image reproduced by permission of Yueyang Gao from *Nanoscale Horiz.*, 2023, 8, 460.

## REVIEW

422

### pH-Responsive wound dressings: advances and prospects

Zeyu Han, Mujie Yuan, Lubin Liu, Kaiyue Zhang, Baodong Zhao, Bin He, Yan Liang\* and Fan Li\*

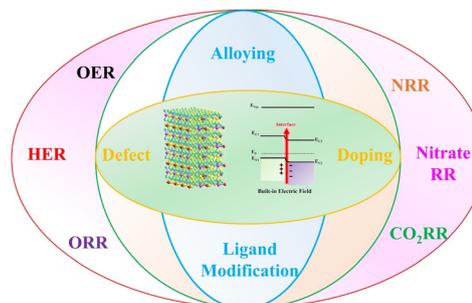


## MINIREVIEWS

441

### Interfacial built-in electric-field for boosting energy conversion electrocatalysis

Hui Xu,\* Junru Li and Xianxu Chu\*



## Editorial Staff

### Executive Editor

Michaela Mühlberg

### Managing Editor

Heather Montgomery

### Editorial Production Manager

Jonathon Watson

### Senior Publishing Editor

Alex Metherell

### Development Editor

Edward Gardner

### Publishing Editors

Blake Baker, Matthew Blow, Chris Dias, Rob Hinde, Ash Hyde, Evie Karkera, Tamara Kosikova, Carole Martin, Kirsty McRoberts, Cat Schofield, Ella White, Tom Williams

### Editorial Assistant

Elizabeth So

### Assistant Editors

Jie Gao, Yu Zhang

### Publisher

Sam Keltie

For queries about submitted papers, please contact Jonathon Watson, Editorial Production Manager in the first instance.

E-mail: [nanoscalehorizons@rsc.org](mailto:nanoscalehorizons@rsc.org)

For pre-submission queries please contact

Michaela Mühlberg, Executive Editor.

E-mail: [nanoscalehorizons-rsc@rsc.org](mailto:nanoscalehorizons-rsc@rsc.org)

Nanoscale Horizons (print: ISSN 2055-6756 electronic:

ISSN 2055-6764) 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: £2727; \$4500.

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 access archive 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)

# Nanoscale Horizons

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

*Nanoscale Horizons* is the home for urgent short reports of exceptionally high quality & innovative nanoscience & nanotechnology



Published in collaboration with the National Centre for Nanoscience and Technology, Beijing, China

## Editorial Board

### Chair

Katharina Landfester, Max Planck Institute for Polymer Research, Germany

### Scientific Editors

Katsuhiko Ariga, National Institute for Materials Science (NIMS), Japan

Wenlong Cheng, Monash University, Australia

Yves Dufrené, Université Catholique de Louvain, Belgium

Anna Fontcuberta i Morral, École polytechnique fédérale de Lausanne, Switzerland

Dirk Guld, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

Zhiyong Tang, National Center for Nanoscience and Technology, China

Jinlan Wang, Southeast University, China

### Members

Michael Sailor, University of California, San Diego, USA

Sarah Tolbert, University of California, Los Angeles, USA

Miqin Zhang, University of Washington, USA

## Advisory Board

Chunli Bai, Chinese Academy of Sciences, China

Uri Banin, Hebrew University of Jerusalem, Israel

Frank Caruso, University of Melbourne, Australia

Cinzia Casiraghi, The University of Manchester, UK

Paola Ceroni, University of Bologna, Italy

Chunying Chen, National Center for Nanoscience and Technology, China

Xiaodong Chen, Nanyang Technological University, Singapore

Serena Corr, University of Sheffield, UK

Harold Craighead, Cornell University, USA

Qing Dai, National Center for Nanoscience and Technology, China

Shuai Dong, Southeast University, China

Laura Fabris, Rutgers University, USA

Andrea Ferrari, University of Cambridge, UK

Raju Kumar Gupta, Indian Institute of Technology Kanpur, India

Xingyu Jiang, Southern University of Science and Technology, China

Rongchao Jin, Carnegie Mellon University, USA

Dong Ha Kim, Ewha Womans University, South Korea

Jang-Kyo Kim, University of New South Wales, Australia

Kostas Kostarelos, University of Manchester, UK

Yamuna Krishnan, University of Chicago, USA

Tai Wei David Leong, National University of Singapore, Singapore

Quan Li, Chinese University of Hong Kong, Hong Kong

Xing Yi Ling, Nanyang Technological University, Singapore

Jie Liu, Duke University, USA

Xiaogang Liu, National University of Singapore, Singapore

Renzhi Ma, National Institute for Materials Science, Japan

Stefan Maier, Ludwig-Maximilians-Universität München, Germany

Liberato Manna, Istituto Italiano di Tecnologia, Italy

Chad Mirkin, Northwestern University, USA

Paul Mulvaney, University of Melbourne, Australia

Catherine Murphy, University of Illinois at Urbana-Champaign, USA

Valeria Nicolosi, Trinity College Dublin, Ireland

Dong Qin, Georgia Institute of Technology, USA

Sandra Rosenthal, Vanderbilt University, USA

Paolo Samori, Université de Strasbourg, France

Ester Segal, Technion - Israel Institute of Technology, Israel

Elena Shevchenko, Argonne National Laboratory, USA

Hisanori Shinohara, Nagoya University, Japan

Zuzanna Siwy, University of California, Irvine, USA

Sara Skrabalak, Indiana University, USA

Francesco Stellacci, École polytechnique fédérale de Lausanne, Switzerland

Ling-Dong Sun, Peking University, China

Shouheng Sun, Brown University, USA

Jonathan Veinot, University of Alberta, Canada

Umesh Waghmare, Jawaharlal Nehru Centre for Advanced Scientific Research, India

Jianfang Wang, Chinese University of Hong Kong, Hong Kong SAR

Sharon Weiss, Vanderbilt University, USA

Benjamin Wiley, Duke University, USA

Stefan Zauscher, Duke University, USA

Xiao Cheng Zeng, University of Nebraska-Lincoln, USA

Hongjie Zhang, Changchun Institute of Applied Chemistry, China

Hua Zhang, City University of Hong Kong, China

Manzhou Zhu, Anhui University, China

Jin Zou, University of Queensland, Australia

## Community Board

Serena Carrara, CNRS Aix-Marseille Université, France

Arun Richard Chandrasekaran, The RNA Institute, University at Albany, SUNY, USA

Ying Diao, University of Illinois at Urbana-Champaign, USA

Qingcheng Dong, Shanghai University, China

Yuanxing Fang, Fuzhou University, China

Azhar Fakharuddin, Interuniversity Microelectronics Centre, Belgium

Calum T. J. Ferguson, Max Planck Institute for Polymer Research, Germany

Lucas Giniati, EPFL, Switzerland

Marilena Hadjilidemetriou, University of Manchester, UK

Shumeng Hao, Georgia Institute of Technology, USA

Samuel S. Hinman, Berkeley Lights, Inc, USA

Nobuhiko Hosono, University of Tokyo, Japan

Jundie Hu, Suzhou University of Science and Technology, China

Shuaidong Huo, Xiamen University, China

Ignacio Insua, University of Santiago de Compostela, Spain

Debrina Jana, Indian Institute of Science Education and Research Mohali, India

Ruibin Jiang, Shaanxi Normal University, China

Yih Hong Lee, Nanyang Technological University, Singapore

Sarah Lerch, Chalmers University of Technology, Sweden

Li Li, Northeastern University, USA

Zhiyuan Liu, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

Saeed Nazemidashtarjandi, The University of Texas at Austin, USA

Sabina Alexandra Nicolae, Queen Mary University of London/Imperial College London, UK

Anamaria Orza, Emory University, USA

Pepita Pla-Vilanova, University of Lleida, Spain

Amirali Papat, The University of Queensland, Australia

Kalyan Raidongia, Indian Institute of Technology Guwahati, India

Satyajit Ratha, Indian Institute of Technology Bhubaneswar, India

Nathaniel Richey, Stanford University, USA

Jungki Ryu, Ulsan National Institute of Science and Technology, Korea

Lei Shao, Beijing Computational Science Research Center, China

Pengzhan Sun, University of Manchester, UK

Jing Tang, The University of Queensland, Australia

Yanlong Wang, Dalian Institute of Chemical Physics, China

Jiangxiang Wu, Tianjin University, China

Tong Wu, Qingdao University, China

Wenzhuo Wu, Purdue University, USA

Xiugang Xie, Hunan University, China

Liguang Xu, Jiangnan University, China

Yikai Xu, Queen's University Belfast, UK

Nobuhiro Yanai, Kyushu University, Japan

Fei Zhang, Tianjin University, China

Zishuai Zhang, The University of British Columbia, Canada

Ya Zhou, Advanced Micro-Fabrication Equipment Inc., China

Kai Zhu, Harbin Engineering University, China

Xiaolu Zhuo, CICBiomagnum, Spain

## Information for Authors

Full details on how to submit material for publication in *Nanoscale 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/nanoscale-horizons](http://rsc.li/nanoscale-horizons)

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

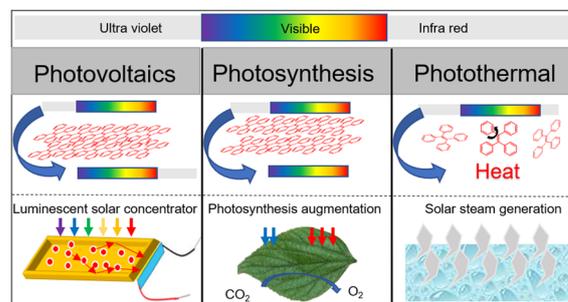


## MINIREVIEWS

453

## Recent advances in aggregation-induced emission materials for enhancing solar energy utilization

Haixiang Liu, Haotian Bai, Jacky W. Y. Lam, Ryan T. K. Kwok and Ben Zhong Tang\*



## COMMUNICATIONS

460

## Amplified EQCM-D detection of extracellular vesicles using 2D gold nanostructured arrays fabricated by block copolymer self-assembly

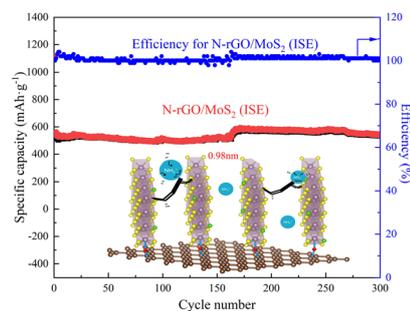
Jugal Suthar, Alberto Alvarez-Fernandez,\* Esther Osarfo-Mensah, Stefano Angioletti-Uberti, Gareth R. Williams and Stefan Guldin\*



473

An interlayer spacing design approach for efficient sodium ion storage in N-doped MoS<sub>2</sub>

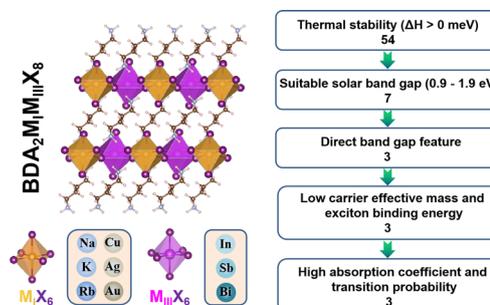
Peng Wang, Wenshan Gou, Tian Jiang, Wenjing Zhao, Kunpeng Ding, Huanxing Sheng, Xin Liu, Qingyu Xu\* and Qi Fan\*



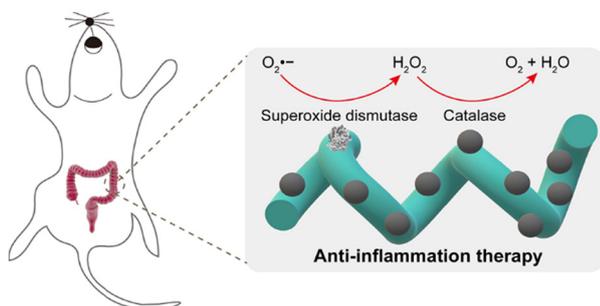
483

Discovering layered lead-free perovskite solar absorbers *via* cation transmutation

Ming Chen, Zhicheng Shan, Xiaofeng Dong, Shengzhong(Frank) Liu\* and Zhuo Xu\*



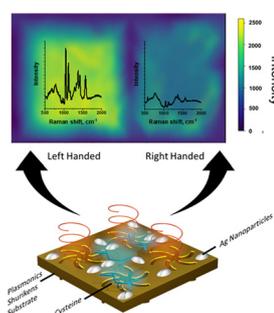
489



### Integrated cascade catalysis of microalgal bioenzyme and inorganic nanozyme for anti-inflammation therapy

Qi-Wen Chen, Meng-Wei Cao, Ji-Yan Qiao, Qian-Ru Li and Xian-Zheng Zhang\*

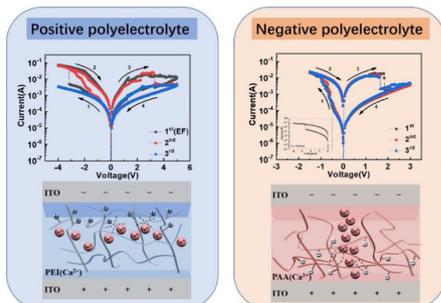
499



### Coupling of plasmonic hot spots with shurikens for superchiral SERS-based enantiomer recognition

Olga Guseynikova,\* Roman Elashnikov, Vaclav Svorcik, Martin Kartau, Cameron Gilroy, Nikolaj Gadegaard, Malcolm Kadodwala, Affar S. Karimullah\* and Oleksiy Lyutakov\*

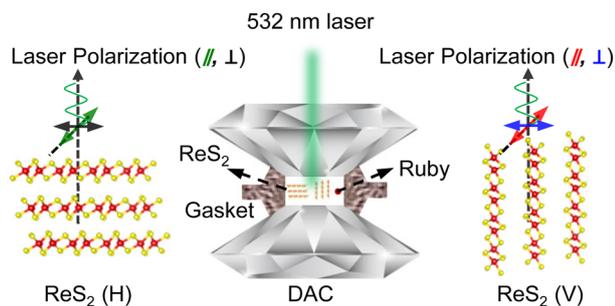
509



### Evaluating charge-type of polyelectrolyte as dielectric layer in memristor and synapse emulation

Jingzhou Shi, Shaohui Kang, Jiang Feng, Jiaming Fan, Song Xue, Gangri Cai\* and Jin Shi Zhao\*

516



### Orientation-polarization dependence of pressure-induced Raman anomalies in anisotropic 2D ReS<sub>2</sub>

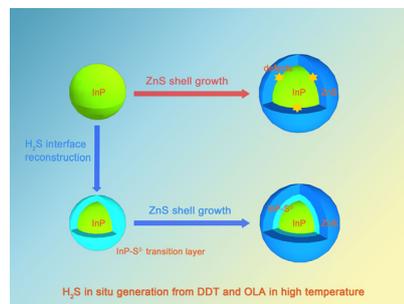
Ting Wen, Maodi Zhang, Jing Li, Chenyin Jiao, Shenghai Pei, Zenghui Wang\* and Juan Xia\*



522

### InP/ZnS quantum dot photoluminescence modulation via *in situ* H<sub>2</sub>S interface engineering

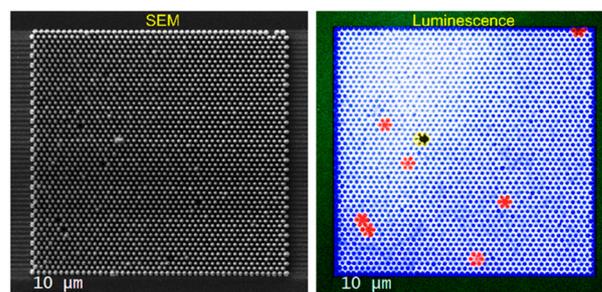
Xiang-Bing Fan, Dong-Wook Shin, Sanghyo Lee, Junzhi Ye, Shan Yu, David J. Morgan, Adrees Arbab, Jiajie Yang, Jeong-Wan Jo, Yoonwoo Kim, Sung-Min Jung, Philip R. Davies, Akshay Rao, Bo Hou and Jong Min Kim\*



530

### Core-shell GaN/AlGaIn nanowires grown by selective area epitaxy

Sonachand Adhikari,\* Felipe Kremer, Mykhaylo Lysevych, Chennupati Jagadish and Hark Hoe Tan\*



543

### A photonic artificial synapse with a reversible multifaceted photochromic compound

Deeksha Sharma, Dheemahi Rao and Bivas Saha\*

