# Nanoscale Horizons

The home for rapid reports of exceptional significance in nanoscience and nanotechnology

# 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

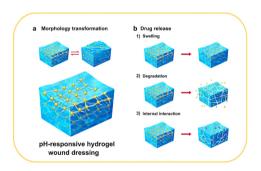
See Alberto Alvarez-Fernandez. Stefan Guldin et al., pp. 460-472. Image reproduced by permission of Yuevang Gao from Nanoscale Horiz., 2023, 8, 460.

#### **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\*

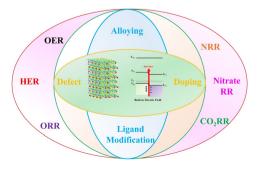


# **MINIREVIEWS**

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** 

Ionathon Watson

Senior Publishing Editor

Alex Metherell

**Development Editor** 

**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

For pre-submission queries please contact

Michaela Mühlberg, Executive Editor.

E-mail: 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

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 arrange access via Internet Protocol (IP) address at 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

For marketing opportunities relating to this journal, contact marketing@rsc.org

# ROYAL SOCIETY **OF CHEMISTRY**

# Nanoscale Horizons

### 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**

Katharina Landfester Max Planck Institute for Polymer Research, Germany

#### Scientific Editors

Katsuhiko Ariga, National Institute for Materials Science (NIMS), Japan Wenlong Cheng, Monash University,

Yves Dufrêne, Université Catholique de

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

Miqin Zhang, University of Washington, USA

#### **Advisory Board**

Chunli Bai, Chinese Academy of Sciences,

Uri Banin, Hebrew University of Jerusalem,

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,

Dong Ha Kim, Ewha Womans University, South Korea

Jang-Kyo Kim, University of New South Wales, Kostas Kostarelos, University of Manchester,

Yamuna Krishnan, University of Chicago

USA Tai Wei David Leong, National University of Singapore, Singapore Quan Li, Chinese University of Hong Kong,

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, Catherine Murphy, University of Illinois at

Urbana-Champaign, USA Valeria Nicolosi, Trinity College Dublin,

Dong Qin, Georgia Institute of Technology, Sandra Rosenthal, Vanderbilt University, USA

Paolo Samorì, 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 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,

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 Qingchen 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 Güniat, EPFL, Switzerland Marilena Hadjidemetriou, 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, 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,

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,

Amirali Popat, 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

Jiangjiexing Wu, Tianjin University, China Tong Wu, Qingdao University,China Wenzhuo Wu, Purdue University, USA Xiuqiang 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,

Xiaolu Zhuo, CICbiomagnue, 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

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 Apart Hollian Learnig to the purposes of research of privace 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.

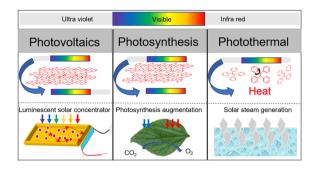
Registered charity number: 207890

### **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\*

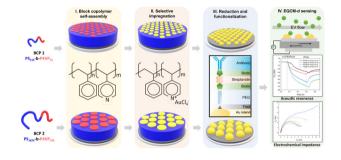


# COMMUNICATIONS

460

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

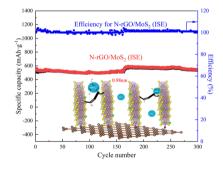
Jugal Suthar, Alberto Alvarez-Fernandez,\* Esther Osarfo-Mensah, Stefano Angioletti-Uberti. Gareth R. Williams and Stefan Guldin\*



473

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

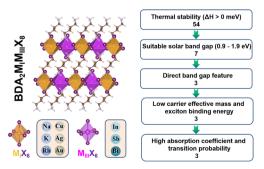
Peng Wang, Wenshan Gou, Tian Jiang, Wenjing Zhao, Kunpeng Ding, Huanxing Sheng, Xin Liu, Qingyu Xu\* and Qi Fan\*



483

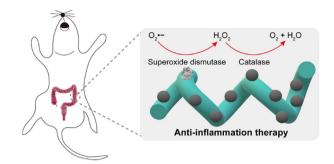
Discovering layered lead-free perovskite solar absorbers via cation transmutation

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



#### **COMMUNICATIONS**

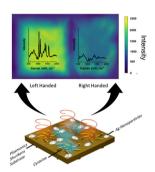
489



# 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\*

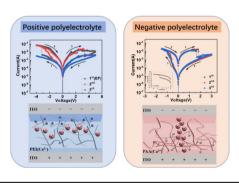
499



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

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

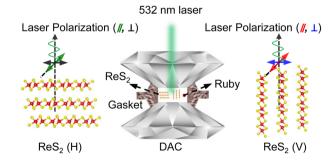
509



# 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>

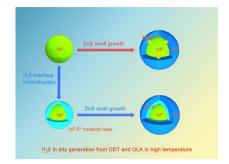
Ting Wen, Maodi Zhang, Jing Li, Chenyin Jiao, Shenghai Pei, Zenghui Wang\* and Juan Xia\*

# COMMUNICATIONS

522

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

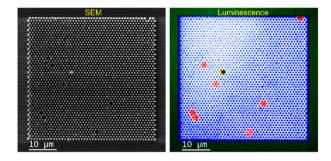
Xiang-Bing Fan, Dong-Wook Shin, Sanghyo Lee, Junzhi Ye, Shan Yu, David J. Morgan, Adrees Arbab, Jiajie Yang, Jeong-Wan Jo, Yoonwoo Kim, Sung-Min Jung, Philip R. Davies, Akshay Rao, Bo Hou and Jong Min Kim\*



530

# Core-shell GaN/AlGaN 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\*

