

# Nanoscale Horizons

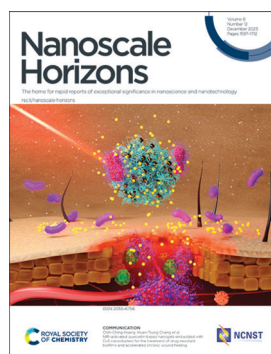
The home for rapid reports of exceptional significance in nanoscience and nanotechnology

[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.

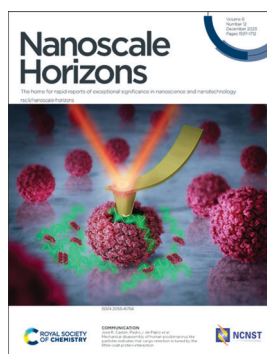
## IN THIS ISSUE

ISSN 2055-6756 CODEN NHAOAW 8(12) 1597-1712 (2023)



### Cover

See Chih-Ching Huang, Huan-Tsung Chang *et al.*, pp. 1652–1664. Image reproduced by permission of Chih-Ching Huang from *Nanoscale Horiz.*, 2023, 8, 1652.



### Inside cover

See José R. Castón, Pedro J. de Pablo *et al.*, pp. 1665–1676. Image reproduced by permission of María J. Rodríguez Espinosa and Pedro J. de Pablo from *Nanoscale Horiz.*, 2023, 8, 1665.

## EDITORIALS

1604

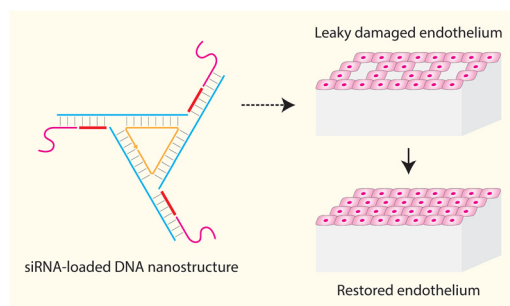
**Nanoscale Horizons Emerging Investigator Series:**  
Dr Ahu Gümrah Dumanli-Parry, University of Manchester, UK



1606

**siRNA-loaded DNA nanostructures restore endothelial leakiness**

Arun Richard Chandrasekaran\*



## 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

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

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 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)

# 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 Dufrene, 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

Miaofang Chi, Oak Ridge National Laboratory, USA  
Jin-Hong Park, Sungkyunkwan University, South Korea  
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 Cussen, 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  
Nobuhiko Hosono, University of Tokyo, Japan  
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  
Li Li, Northeastern University, USA  
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, Monash University, Australia  
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  
Jungki Ryu, Ulsan National Institute of Science and Technology, Korea  
Michael Sailor, University of California, San Diego, USA  
Paolo Samori, Université de Strasbourg, France  
Leslie Schoop, Princeton University, USA  
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  
Sarah Tolbert, University of California, Los Angeles, 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  
Wenzhuo Wu, Purdue University, USA  
Nobuhiro Yanai, Kyushu University, Japan  
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

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

## 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

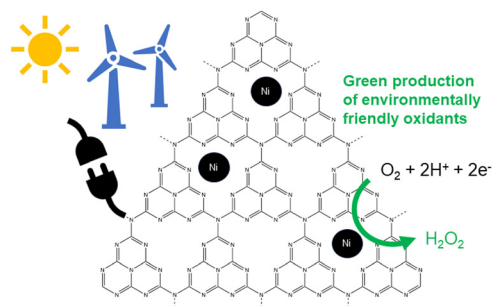


## EDITORIALS

1608

Electrifying H<sub>2</sub>O<sub>2</sub> synthesis with g-C<sub>3</sub>N<sub>4</sub>-based single atom catalysts

Jungki Ryu\*

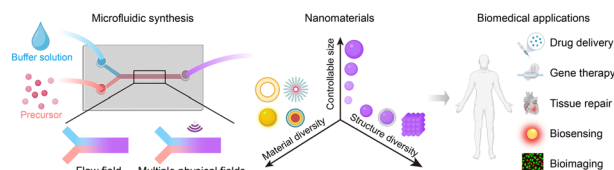


## REVIEWS

1610

## Microfluidic synthesis of nanomaterials for biomedical applications

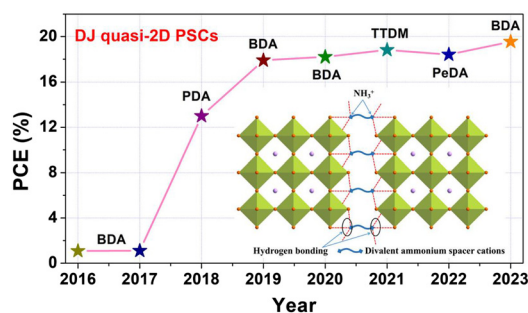
Yanjuan Huang, Chao Liu, Qiang Feng\* and Jiashu Sun\*



1628

## The rise of quasi-2D Dion–Jacobson perovskites for photovoltaics

Jieyi Chen, Zihao Zhai,\* Qi Liu and Huiqiong Zhou\*

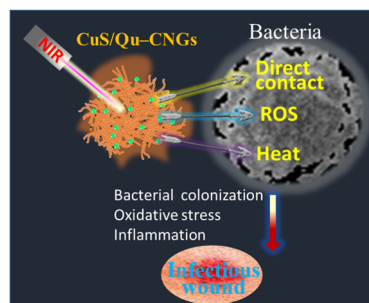


## COMMUNICATIONS

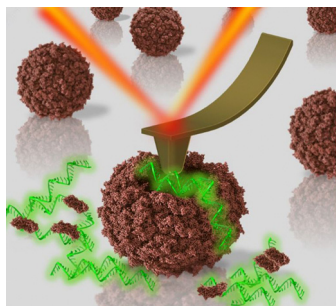
1652

## NIR-activated quercetin-based nanogels embedded with CuS nanoclusters for the treatment of drug-resistant biofilms and accelerated chronic wound healing

Amit Nain, Yu-Ting Tseng, Akash Gupta, Yu-Feng Lin, Sangili Arumugam, Yu-Fen Huang, Chih-Ching Huang\* and Huan-Tsung Chang\*



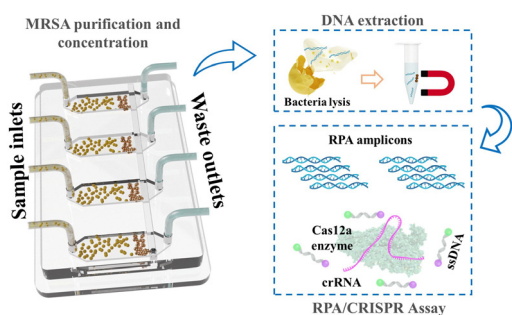
1665



### Mechanical disassembly of human picobirnavirus like particles indicates that cargo retention is tuned by the RNA-coat protein interaction

María J. Rodríguez-Espinosa, Javier M. Rodríguez, José R. Castón\* and Pedro J. de Pablo\*

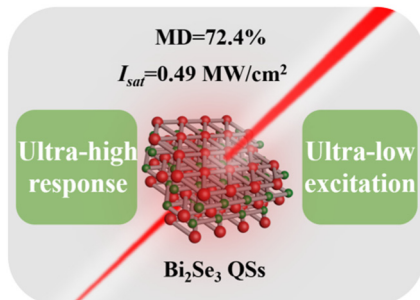
1677



### Pneumatic nano-sieve for CRISPR-based detection of drug-resistant bacteria

Ruonan Peng, Xinye Chen, Fengjun Xu, Richard Hailstone, Yujie Men and Ke Du\*

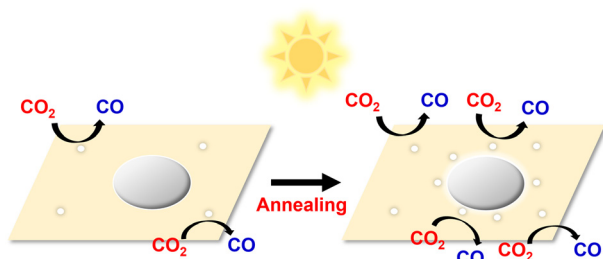
1686



### Quantum-sized topological insulators/semimetals enable ultrahigh and broadband saturable absorption

Zhexue Chen, Xinyu Sui, Zhangqiang Li, Yueqi Li, Xinfeng Liu and Yong Zhang\*

1695



### Defect engineering enhances plasmonic-hot electrons exploitation for CO<sub>2</sub> reduction over polymeric catalysts

Hang Yin, Zhehao Sun, Kaili Liu, Ary Anggara Wibowo, Julien Langley, Chao Zhang, Sandra E. Saji, Felipe Kremer, Dmitri Golberg, Hieu T. Nguyen, Nicholas Cox and Zongyou Yin\*



1700

## A selenoureido-iminoglycolipid transported by zeolitic-imidazolate framework nanoparticles: a novel antioxidant therapeutic approach

Fátima Guerrero, Andrés Carmona, Victoria Vidal, Ana Franco, Alejandro Martín-Malo, Elena M. Sánchez-Fernández\* and Carolina Carrillo-Carrión\*

