

Nanoscale Horizons

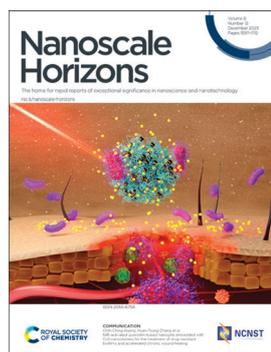
The home for rapid reports of exceptional significance in nanoscience and nanotechnology

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(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

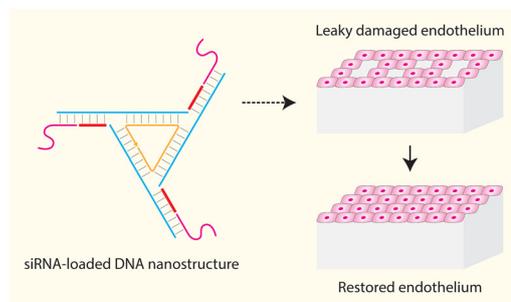
Nanoscale Horizons Emerging Investigator Series:
Dr Ahu Gümrah Dumanli-Parry, University of Manchester, UK



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

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

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

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 Dufr ne, Universit  Catholique de Louvain, Belgium

Anna Fontcuberta i Morral,  cole polytechnique f d rale de Lausanne, Switzerland
Dirk Guld, Friedrich-Alexander-Universit t Erlangen-N rnberg, 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, Universit  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,  cole polytechnique f d rale 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

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 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

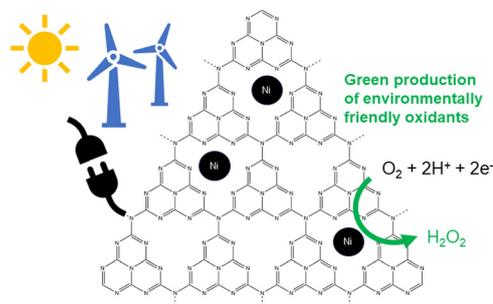


EDITORIALS

1608

Electrifying H₂O₂ synthesis with g-C₃N₄-based single atom catalysts

Jungki Ryu*

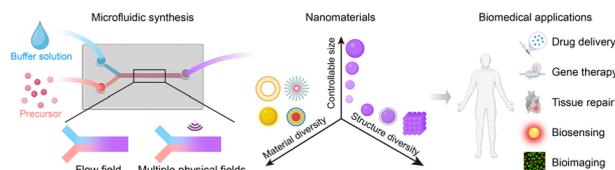


REVIEWS

1610

Microfluidic synthesis of nanomaterials for biomedical applications

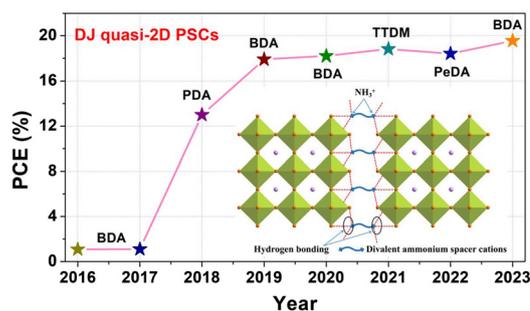
Yanjuan Huang, Chao Liu, Qiang Feng* and Jiashu Sun*



1628

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

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

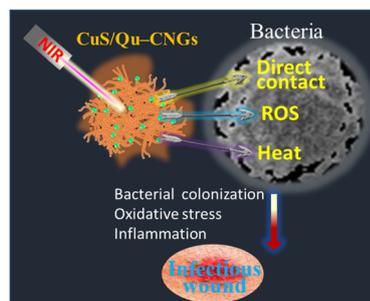


COMMUNICATIONS

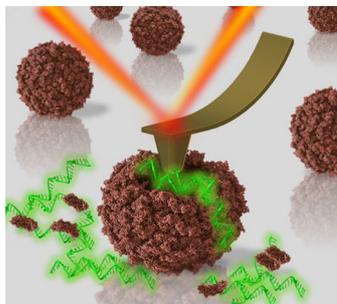
1652

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*



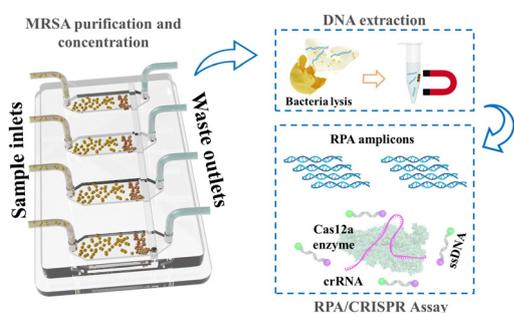
1665



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*

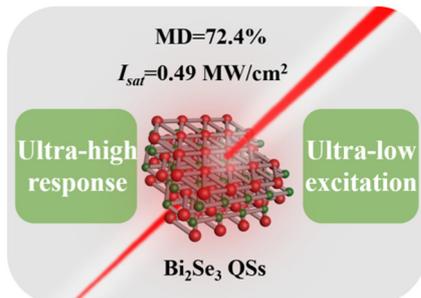
1677



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

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

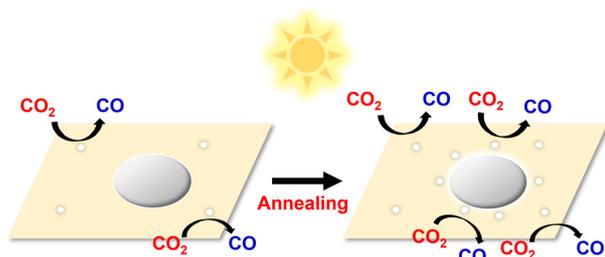
1686



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 CO₂ reduction over polymeric catalysts

Hang Yin, Zehao 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*

