Nanoscale Horizons

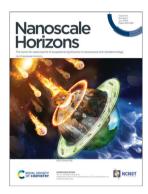
The home for rapid reports of exceptional significance in nanoscience and nanotechnology

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(7) 845-966 (2023)



Cover

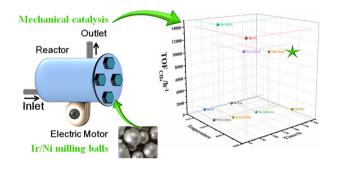
See Tie Yu, Weigiao Deng et al., pp. 852-858. Image reproduced by permission of Weigiao Deng from Nanoscale Horiz., 2023, 8, 852.

COMMUNICATIONS

852

Single-atom alloy Ir/Ni catalyst boosts CO₂ methanation via mechanochemistry

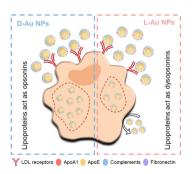
Rui Tu, Yujie Zhang, Yuchun Xu, Junxia Yang, Ling Zhang, Keran Lv, Guoging Ren, Shengliang Zhai, Tie Yu* and Weigiao Deng*



859

Stereoselective coronas regulate the fate of chiral gold nanoparticles in vivo

Didar Baimanov, Liming Wang, Ke Liu, Mengmeng Pan, Rui Cai, Hao Yuan, Wanxia Huang, Qingxi Yuan, Yunlong Zhou,* Chunying Chen* and Yuliang Zhao*



Editorial Staff

Executive Editor

Michaela Mühlberg

Managing Editor

Heather Montgomery

Editorial Production Manager

Ionathon Watson

Senior Publishing Editor

Alex Metherell

Development Editor

Publishing Editors

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

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

Miaofang Chi, Oak Ridge National Laboratory, USA Jin-Hong Park, Pohang University of Science and Technology, South Korea Miqin Zhang, University of Washington, USA

Advisory Board

Chunli Bai, Chinese Academy of Sciences,

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,

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,

Tai Wei David Leong, National University of Singapore, Singapore Li Li, Northeastern University, USA

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, 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,

Sandra Rosenthal, Vanderbilt University, USA Jungki Ryu, Ulsan National Institute of Science and Technology, Korea Michael Sailor, University of California, San Diego, USA

Paolo Samorì, Université de Strasbourg, 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 IISA

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,

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,

Manzhou Zhu, Anhui University, China Jin Zou, University of Queensland, Australia

Community Board

Arun Richard Chandrasekaran, The RNA Institute, University at Albany, SUNY, USA 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 Jundie Hu, Suzhou University of Science and Technology, China Shuaidong Huo, Xiamen University, China Ignacio Insua, University of Santiago de Compostela, Spain Education and Research Mohali, Indi Zhiyuan Liu, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences,

Saeed Nazemidashtarjandi, The University of

Texas at Austin, USA Pepita Pla-Vilanova, University of Lleida,

Satyajit Ratha, Indian Institute of Technology Bhubaneswar, India Pengzhan Sun, University of Manchester, UK

Yanlong Wang, Dalian Institute of Chemical Physics, China

Jiangjiexing Wu, Tianjin University, China Tong Wu, Qingdao University, China Xiuqiang Xie, Hunan University, China Yikai Xu, Queen's University Belfast, UK Fei Zhang, Tianjin University , China Zishuai Zhang, The University of British Columbia, Canada Kai Zhu, Harbin Engineering University,

Xiaolu Zhuo, The Chinese University of Hong

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

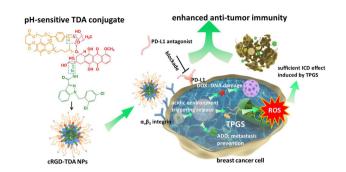


COMMUNICATIONS

870

cRGD-modified nanoparticles of multi-bioactive agent conjugate with pH-sensitive linkers and PD-L1 antagonist for integrative collaborative treatment of breast cancer

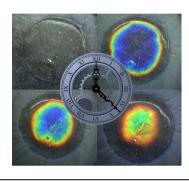
Chenming Zou, Yuepeng Tang, Ping Zeng, Derong Cui, Majdi Al Amili, Ya Chang, Zhu Jin, Yuanyuan Shen,* Songwei Tan* and Shengrong Guo*



887

Edible cellulose-based colorimetric timer

Gen Kamita, Silvia Vignolini* and Ahu Gümrah Dumanli*



892

Understanding silicon monoxide gas evolution from mixed silicon and silica powders

Kevin M. O'Connor, Abbie Rubletz, Jonathan Trach. Cole Butler and Jonathan G. C. Veinot*



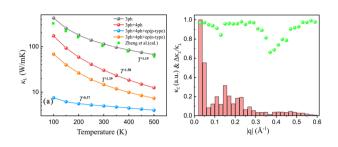
Bringing ultimate depth to scanning tunnelling microscopy: deep subsurface vision of buried nano-objects in metals

Oleg Kurnosikov,* Muriel Sicot, Emilie Gaudry, Danielle Pierre, Yuan Lu and Stéphane Mangin



COMMUNICATIONS

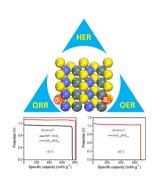
912



Intervalley scattering induced significant reduction in lattice thermal conductivities for phosphorene

Yu Wu,* Ying Chen, Lei Peng, Hao Zhang* and LiuJiang Zhou*

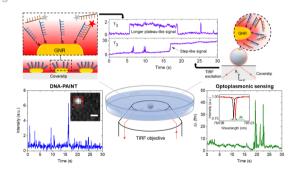
921



Heterointerface promoted trifunctional electrocatalysts for all temperature highperformance rechargeable Zn-air batteries

Nayantara K. Wagh, Dong-Hyung Kim, Chi Ho Lee, Sung-Hae Kim, Han-Don Um, Joseph Sang-Il Kwon, Sambhaji S. Shinde,* Sang Uck Lee and Jung-Ho Lee*

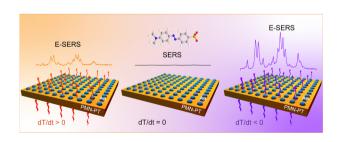
935



Anomalous DNA hybridisation kinetics on gold nanorods revealed via a dual single-molecule imaging and optoplasmonic sensing platform

Narima Eerqing,* Hsin-Yu Wu, Sivaraman Subramanian, Serge Vincent and Frank Vollmer

948



Giant enhancement of the initial SERS activity for plasmonic nanostructures via pyroelectric PMN-PT

Mingrui Shao, Di Liu, Jinxuan Lu, Xiaofei Zhao, Jing Yu, Chao Zhang, Baoyuan Man,* Hui Pan* and Zhen Li*

COMMUNICATIONS

958

Nonvolatile electro-mechanical coupling in two-dimensional lattices

Xilong Xu, Ting Zhang, Ying Dai,* Baibiao Huang and Yandong Ma*

