

Nanoscale Horizons

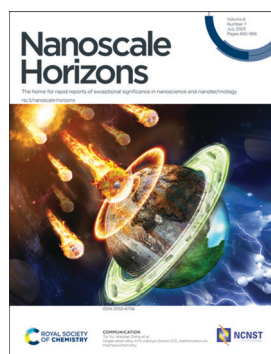
The home for rapid reports of exceptional significance in nanoscience and nanotechnology

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

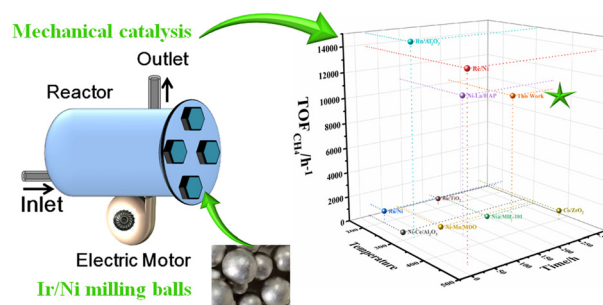
See Tie Yu, Weiqiao Deng *et al.*, pp. 852–858.
Image reproduced by permission of Weiqiao Deng from Nanoscale Horiz., 2023, 8, 852.

COMMUNICATIONS

852

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

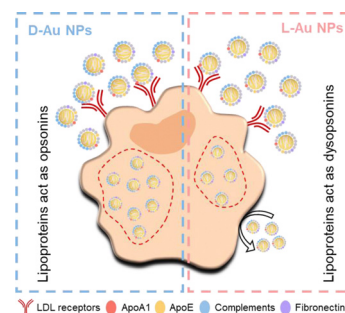
Rui Tu, Yujie Zhang, Yuchun Xu, Junxia Yang, Ling Zhang, Keran Lv, Guoqing Ren, Shengliang Zhai, Tie Yu* and Weiqiao Deng*



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

Jonathon Watson

Senior Publishing Editor

Alex Metherell

Development Editor

Edward Gardner

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 0WE.

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 0WE, 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 Dufrène, 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, Pohang University of Science and Technology, 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 Mirklin, 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

Jungkuk Ryu, Ulsan National Institute of

Science and Technology, Korea

Michael Sailor, University of California,

San Diego, 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

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

Nobuhiko 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

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,

China

Saeed Nazemidashtarjandi, The University of

Texas at Austin, USA

Pepita Pla-Vilanova, University of Lleida,

Spain

Satyajit Ratha, Indian Institute of Technology

Bhubaneswar, India

Pengzhan Sun, University of Manchester, UK

Yanlong Wang, Dalian Institute of Chemical

Physics, China

Jiangxiexing Wu, Tianjin University, China

Tong Wu, Qingdao University, China

Xiuliang 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,

China

Xiaolu Zhuo, The Chinese University of Hong

Kong, China

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

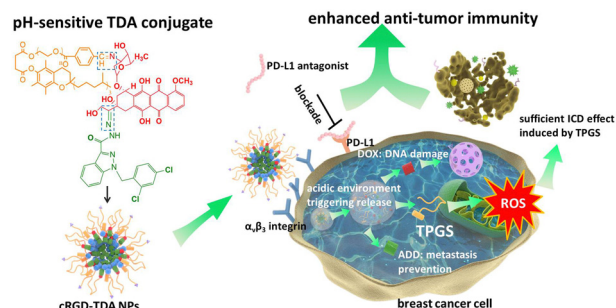


COMMUNICATIONS

870

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

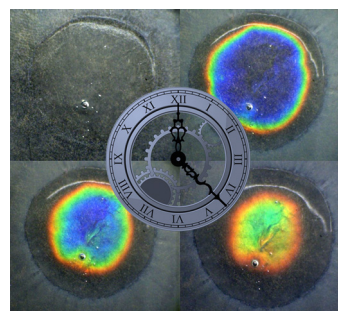
Chenming Zou, Yuepeng Tang, Ping Zeng, Derong Cui, Majdi Al Amili, Ya Chang, Zhu Jin, Yuanyuan Shen,* Songwei Tan* and Shengrong Guo*



887

Edible cellulose-based colorimetric timer

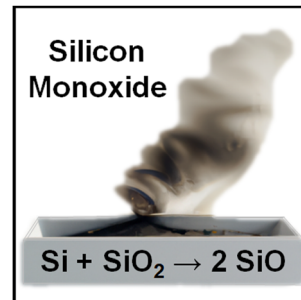
Gen Kamita, Silvia Vignolini* and Ahu Gümrah Dumanlı*



892

Understanding silicon monoxide gas evolution from mixed silicon and silica powders

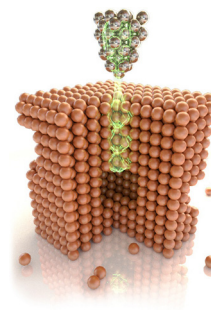
Kevin M. O'Connor, Abbie Rubletz, Jonathan Trach, Cole Butler and Jonathan G. C. Veinot*



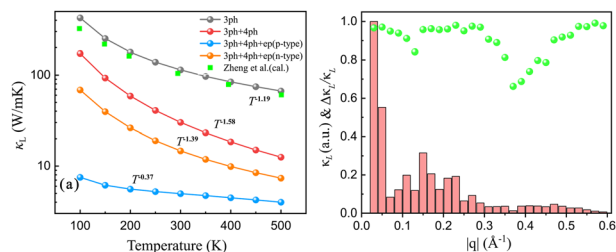
900

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



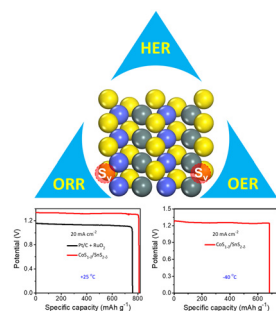
912



Intervalley scattering induced significant reduction in lattice thermal conductivities for phosphorene

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

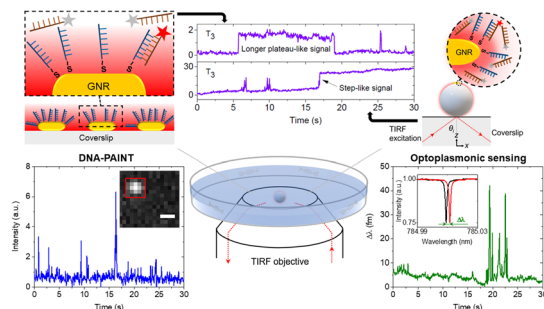
921



Heterointerface promoted trifunctional electrocatalysts for all temperature high-performance 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*

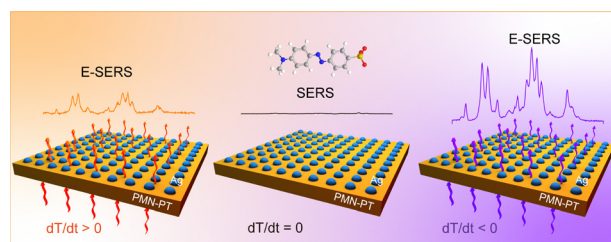
935



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*



958

Nonvolatile electro-mechanical coupling in two-dimensional lattices

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

