

# Nanoscale Advances

An open access journal publishing across the breadth of nanoscience and nanotechnology  
[rsc.li/nanoscale-advances](https://rsc.li/nanoscale-advances)

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.

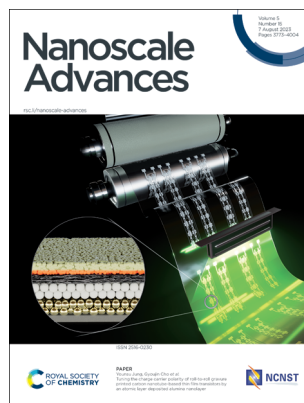
## IN THIS ISSUE

ISSN 2516-0230 CODEN NAADAI 5(15) 3773–4004 (2023)



### Cover

See Riku Kawasaki, Atsushi Ikeda *et al.*, pp. 3857–3861. Image reproduced by permission of Riku Kawasaki from *Nanoscale Adv.*, 2023, 5, 3857.



### Inside cover

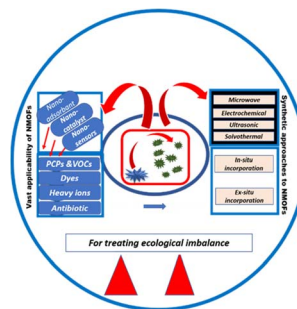
See Younsu Jung, Gyoujin Cho *et al.*, pp. 3879–3886. Image reproduced by permission of Gyoujin Cho from *Nanoscale Adv.*, 2023, 5, 3879.

## REVIEWS

3782

### Nanoscale designing of metal organic framework moieties as efficient tools for environmental decontamination

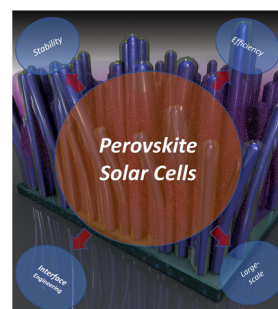
Indu Sharma, Jaspreet Kaur, Gargi Poonia, Surinder Kumar Mehta\* and Ramesh Kataria\*



3803

### A comprehensive review of the current progresses and material advances in perovskite solar cells

Rabia Sharif, Arshi Khalid, Syed Waqas Ahmad, Abdul Rehman, Haji Ghulam Qutab, Hafiz Husnain Akhtar, Khalid Mahmood,\* Shabana Afzal and Faisal Saleem



## Editorial Staff

### Executive Editor

Jeremy Allen

### Deputy Editor

Hannah Kerr

### Editorial Assistant

Rosie Hague

### Editorial Production Manager

Christopher Goodall

### Assistant Editors

Zita Zachariah and Serra Arslançan Sengelen

### Publisher

Neil Hammond

For queries about submitted papers, please contact Christopher Goodall, Editorial Production Manager in the first instance. E-mail: [nanoscaleadvances@rsc.org](mailto:nanoscaleadvances@rsc.org)

For pre-submission queries please contact Jeremy Allen, Executive Editor. E-mail: [nanoscaleadvances@rsc.org](mailto:nanoscaleadvances@rsc.org)

Nanoscale Advances (electronic: ISSN 2516-0230) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WE.

Nanoscale Advances is a Gold Open Access journal and all articles are free to read. Please email [orders@rsc.org](mailto:orders@rsc.org) to register your interest or contact 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](mailto:orders@rsc.org)

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 Advances

[rsc.li/nanoscale-advances](http://rsc.li/nanoscale-advances)

*Nanoscale Advances* publishes experimental and theoretical work across the breadth of nanoscience and nanotechnology.



Published in collaboration with the National Centre for Nanoscience and Technology, Beijing, China

## Editorial Board

### Editors-in-chief

Chunli Bai, National Centre for Nanoscience and Nanotechnology, China

Dirk Guld, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

### Associate Editors

Cinzia Casiraghi, University of Manchester, UK  
Gianurelio (Giovanni) Cuniberti, TU Dresden, Germany

Qing Dai, National Center for Nanoscience and Technology of China, China

Yves Dufrene, Université Catholique de Louvain, Belgium

Andrea Ferrari, University of Cambridge, UK  
Dong Ha Kim, Ewha Womens University, Korea

Christian Klink, University of Rostock, Germany

Quan Li, The Chinese University of Hong Kong, Hong Kong

Zhiqun Lin, National University of Singapore, Singapore

Xing Yi Ling, Nanyang Technological University, Singapore

Xiaogang Liu, National University of Singapore, Singapore

Renzi Ma, National Institute for Materials Science, Japan

Janet Macdonald, Vanderbilt University, USA  
Teresa Pellegrino, Istituto Italiano di Tecnologia, Italy

Elena Shevchenko, Argonne National Laboratory, USA

Jonathan Veinot, University of Alberta, Canada  
Umesh Waghmare, JNCASR, India

Jinlan Wang, Southeast University, China  
Manzhou Zhu, Anhui University, China

Jin Zou, University of Queensland, Australia

## Advisory Board

Suryasarathi Bose, Indian Institute of Science Bangalore, India

Stephanie Brock, Wayne State University, USA

Raffaella Buonsanti, EPFL, Switzerland

Chunying Chen, National Centre for Nanoscience and Technology of China, China

Jingyi Chen, University of Arkansas, USA

Xiaodong Chen, Nanyang Technological University, Singapore

Wenlong Cheng, Monash University, Australia

Serena Cussen, University of Sheffield, UK

Mita Dasog, Dalhousie University, Canada

Kristen Fichthorn, Penn State University, USA

Christy Haynes, University of Minnesota, USA

Guohua Jia, Curtin University, Australia

Xingyu Jiang, Southern University of Science and Technology, China

Rongchao Jin, Carnegie Mellon University, USA

Song Jin, University of Wisconsin, USA

Jesse Jokerst, University of California San Diego, USA

Kouros Kalantar-zadeh, The University of Sydney, Australia

Katharina Landfester, Max Planck Institute for Polymer Research, Germany

Dattatray Late, CSIR - National Chemical Laboratory, India

Pooi See Lee, Nanyang Technological University, Singapore

Changming Li, Southwest University, China

Jie Liu, Duke University, USA

Laura Na Liu, Max Planck Institute for Intelligent Systems, Germany

Liberato Manna, Istituto Italiano di Tecnologia, Italy

Anna Fontcuberta i Morral, EPFL, Switzerland

Catherine Murphy, University of Illinois at Urbana-Champaign, USA

Kostya Ostrikov, Queensland University of Technology, Australia

So-Jung Park, Ewha Womans University, Korea

Lakshmi Polavarapu, University of Vigo, Spain

Thalappil Pradeep, Indian Institute of Technology Madras, India

Narayan Pradhan, Indian Association for the Cultivation of Science, India

Dong Qin, Georgia Tech University, USA

Michael Sailor, University of California, San Diego, USA

Hyeon Suk Shin, Ulsan National Institute of Science and Technology, South Korea

Zhigang Shuai, Tsinghua University, China

Sara Skrabalak, Indiana University, USA

Francesco Stellacci, EPFL, Switzerland

Hong-Bo Sun, Jilin University, China

Shouheng Sun, Brown University, USA

Xiaoming Sun, Beijing University of Chemical Technology, China

Dmitri Talapin, University of Chicago, USA

Zhiyong Tang, National Center for

NanoScience and Technology, China

Mauricio Terrones, The Pennsylvania State University, USA

Sarah Tolbert, University of California, Los Angeles, USA

Ventsislav Valev, University of Bath, UK

Miriam Vitiello, CNR Nanotec, Italy

Jianfang Wang, Chinese University of Hong Kong, Hong Kong SAR

Benjamin Wiley, Duke University, USA

Xiaoqun Wu, University of Science and Technology of China, China

Yuyi Xiong, University of Science and Technology of China, China

Hongxing Xu, Wuhan University, China

Lin Xu, Nanjing Normal University, China

Ya Yang, Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China

Jinhua Ye, National Institute for Materials Science, Japan

Xiao Cheng Zeng, University of Nebraska-Lincoln, USA

Gang Zhang, Institute of High Performance Computing, Singapore

Hua Zhang, City University of Hong Kong, China

Miqin Zhang, University of Washington, USA

## Information for Authors

Full details on how to submit material for publication in Nanoscale Advances 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-advances](http://rsc.li/nanoscale-advances)

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

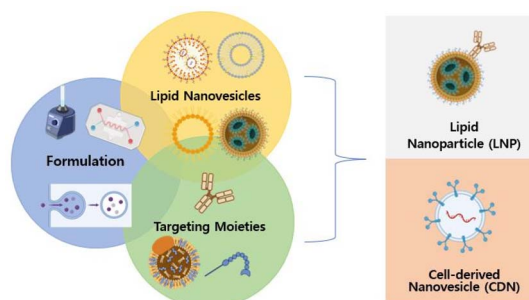


## REVIEWS

3834

**Strategies for targeted gene delivery using lipid nanoparticles and cell-derived nanovesicles**

Dong-yup Lee, Sivashanmugam Amirthalingam, Changyub Lee, Arun Kumar Rajendran, Young-Hyun Ahn and Nathaniel S. Hwang\*

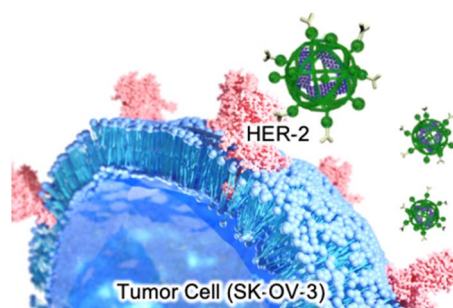


## COMMUNICATIONS

3857

**HER-2-targeted boron neutron capture therapy using an antibody-conjugated boron nitride nanotube/ $\beta$ -1,3-glucan complex**

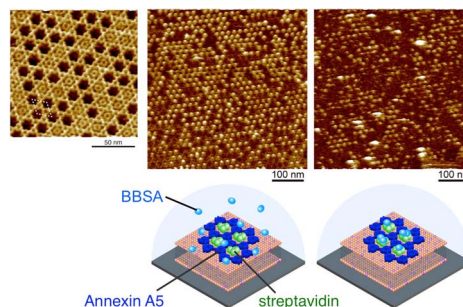
Keita Yamana, Riku Kawasaki,\* Kousuke Kondo, Hidetoshi Hirano, Shogo Kawamura, Yu Sanada, Kaori Bando, Anri Tabata, Hideki Azuma, Takushi Takata, Yoshinori Sakurai, Hiroki Tanaka, Tomoki Kodama, Seiji Kawamoto, Takeshi Nagasaki and Atsushi Ikeda\*



3862

**Protein nanoarrays using the annexin A5 two-dimensional crystal on supported lipid bilayers**

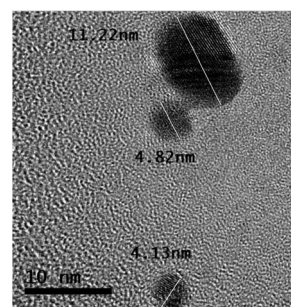
Hiroaki Kominami, Yoshiki Hirata, Hirofumi Yamada and Kei Kobayashi\*



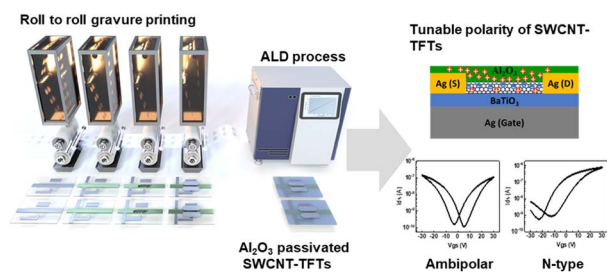
3871

**Developing tiny-sized particles, different modification behaviors of gold atoms, and nucleating distorted particles**

Mubarak Ali\* and I.-Nan Lin



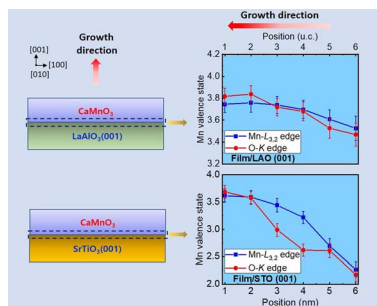
3879



### Tuning the charge carrier polarity of roll-to-roll gravure printed carbon nanotube-based thin film transistors by an atomic layer deposited alumina nanolayer

Wei Zhang, Sagar Shrestha, Sajjan Parajuli, Bijendra Bishow Maskey, Jinhwa Park, Hao Yang, Younsu Jung\* and Gyoujin Cho\*

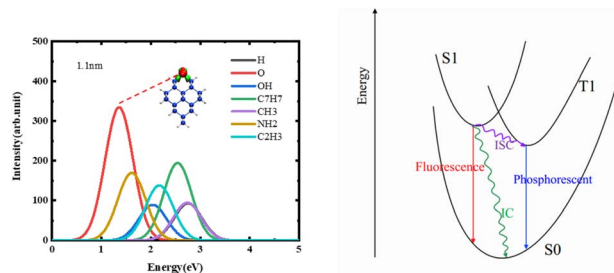
3887



### Strain-induced Mn valence state variation in $\text{CaMnO}_{3-\delta}$ /substrate interfaces: electronic reconstruction versus oxygen vacancies

Van-Hien Hoang, Nam-Suk Lee\* and Heon-Jung Kim\*

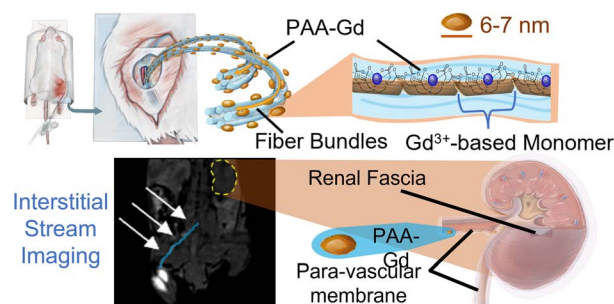
3896



### The luminescence mechanism of ligand-induced interface states in silicon quantum dots

Jian Zhou, Fengyang Ma, Kai Chen, Wuyan Zhao, Riyi Yang, Chong Qiao, Hong Shen, Wan-Sheng Su,\* Ming Lu, Yuxiang Zheng, Rongjun Zhang, Liangyao Chen and Songyou Wang\*

3905



### A robust MRI contrast agent for specific display of the interstitial stream

Xiaohan Zhou, Junwei Cheng, Fangfei He, Zhuo Ao, Peisen Zhang, Jing Wang, Qing Li, Weinan Tang, Yiyan Zhou, Yan Liang, Yi Hou,\* Wentao Liu\* and Dong Han\*



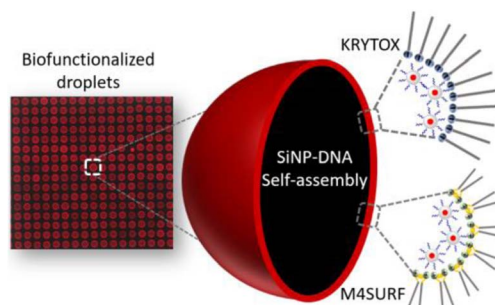


## PAPERS

3914

### Charge controlled interactions between DNA-modified silica nanoparticles and fluorosurfactants in microfluidic water-in-oil droplets

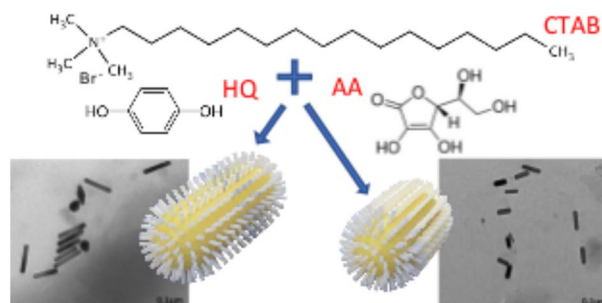
Sahana Sheshachala, Birgit Huber, Jan Schuetzke, Ralf Mikut, Tim Scharnweber, Carmen M. Domínguez,\* Hatice Mutlu\* and Christof M. Niemeyer\*



3924

### Gold nanorods derivatized with CTAB and hydroquinone or ascorbic acid: spectroscopic investigation of anisotropic nanoparticles of different shapes and sizes

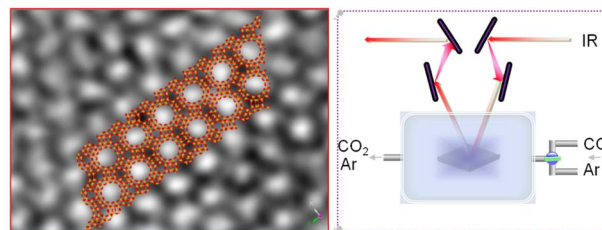
Simone Amatori, Alberto Lopez, Carlo Meneghini, Annarica Calcabrini, Marisa Colone, Annarita Stringaro, Sofia Migani, Ivan Khalakhan, Giovanna Iucci, Iole Venditti and Chiara Battocchio\*



3934

### *In situ* infrared CO detection using silver loaded EMT zeolite films

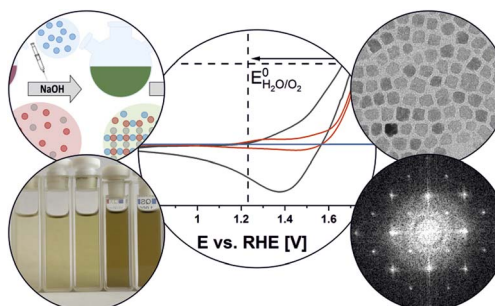
Yuda Wang, Haitao He, Jiao Sun,\* Xinyao Zhang, Mahmut Zulpaya, Xianhong Zheng, Lin Xu and Biao Dong



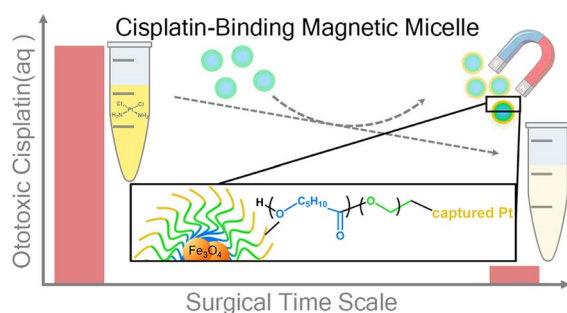
3942

### Size-controlled liquid phase synthesis of colloidal stable Co<sub>3</sub>O<sub>4</sub> nanoparticles

Johannes Kießling,\* Sabine Rosenfeldt and Anna S. Schenk\*



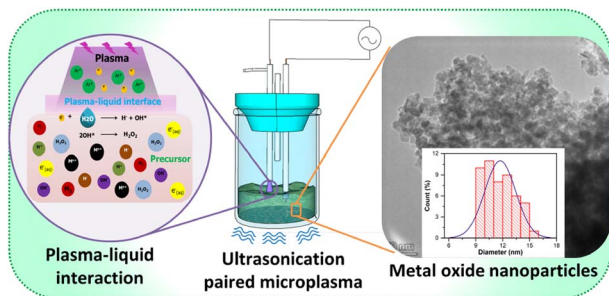
3955



### Chelate-functionalized magnetic micelles for sequestration of cisplatin

Kang Du, Pan Liao, Shengsong Yang, Dora von Trentini, Kushal Sharma, Xiaorui Shi, Christopher B. Murray, Daqing Li\* and Ivan J. Dmochowski\*

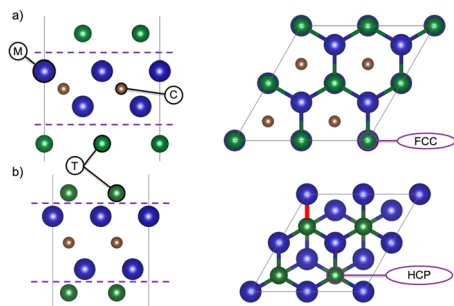
3964



### A simple microplasma reactor paired with indirect ultrasonication for aqueous phase synthesis of cobalt oxide nanoparticles

Sosiawati Teke, Md. Mokter Hossain, Roshan Mangal Bhattarai, Shirjana Saud, Avik Denra, Mai Cao Hoang Phuong Lan Nguyen, Adnan Ali, Van Toan Nguyen and Young Sun Mok\*

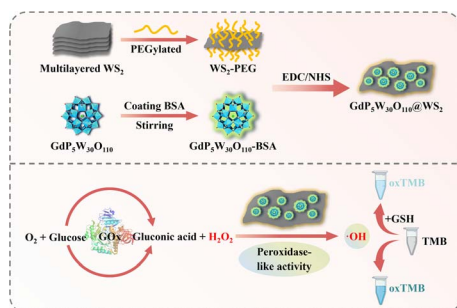
3976



### A systematic study of work function and electronic properties of MXenes from first principles

Khabib Yusupov,\* Jonas Björk and Johanna Rosen

3985



### A polyoxometalate-based heterojunction nanozyme with peroxidase-mimic catalytic activity for sensitive biomolecule detection

Guobo Du, Mingzhu Lv, Huan Wang, Chenghui Liu, Qiqi Xu, Jiajie Liu, Zhu Yang, Yuan Yong\* and Yunwei Han\*

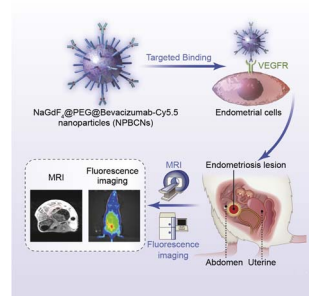


## PAPERS

3994

# Endometriosis-targeted MRI imaging using bevacizumab-modified nanoparticles aimed at vascular endothelial growth factor

Qi Zhang, Shiman Wu, Yajie Li, Mao Lai, Qing Li, Caixia Fu, Zhenwei Yao\* and Junhai Zhang\*



## CORRECTION

4002

# Correction: Optimization and characterization of miRNA-129-5p-encapsulated poly (lactic-co-glycolic acid) nanoparticles to reprogram activated microglia

Irina Kalashnikova, Heather R. Campbell, Daniel Kolpek and Jonghyuck Park\*

