

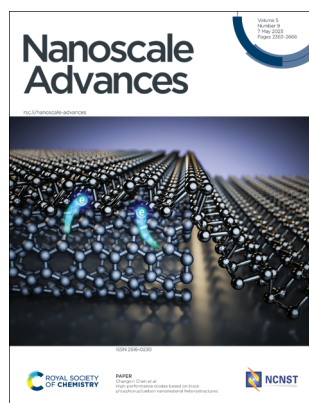
# Nanoscale Advances

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(9) 2363–2666 (2023)



**Cover**  
See Changxin Chen *et al.*,  
pp. 2427–2436. Image  
reproduced by permission of  
Changxin Chen from  
*Nanoscale Adv.*, 2023, 5, 2427.



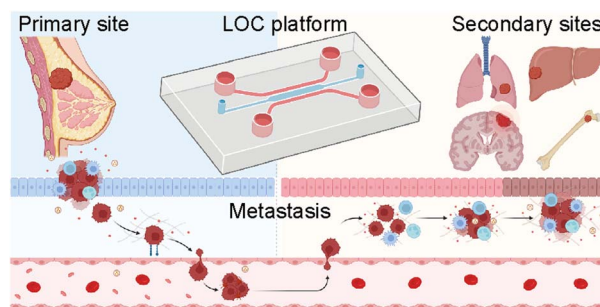
**Inside cover**  
See Kyra Sedransk Campbell  
*et al.*, pp. 2437–2452. Image  
reproduced by permission of  
Dr Kyra Sedransk Campbell  
from *Nanoscale Adv.*,  
2023, 5, 2437.

## REVIEWS

2375

### Recent advances in lab-on-a-chip systems for breast cancer metastasis research

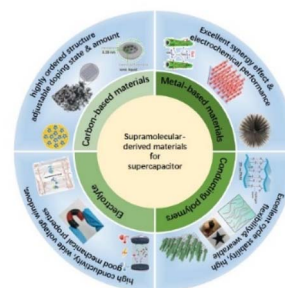
Burcu Firatligil-Yildirim,\* Ozden Yalcin-Ozuyal and Nonappa\*



2394

### Recent advances in supramolecular self-assembly derived materials for high-performance supercapacitors

Honghong Cheng,\* Ruliang Liu, Ruyi Zhang, Lan Huang and Qiaoyi Yuan



**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 Arslanlan 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@rsc.org](mailto:nanoscaleadvances-rsc@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 Guldi, 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 Klinko, 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

Renzhi Ma, National Institute for Materials Science, Japan

Janet Macdonald, Vanderbilt University, USA

Teresa Pellegrino, Istituto Italiano di Tecnologia, Italy

Dong Qin, Georgia Institute of Technology, USA

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

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

Thalapil 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

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

Yujie 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.

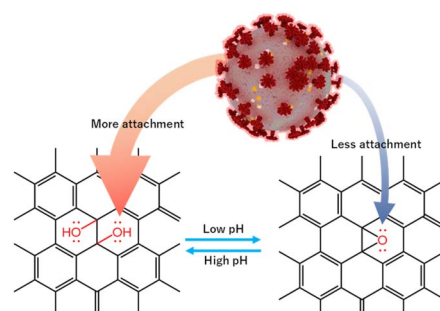
Registered charity number: 207890



2413

### SARS-CoV-2 suppression depending on the pH of graphene oxide nanosheets

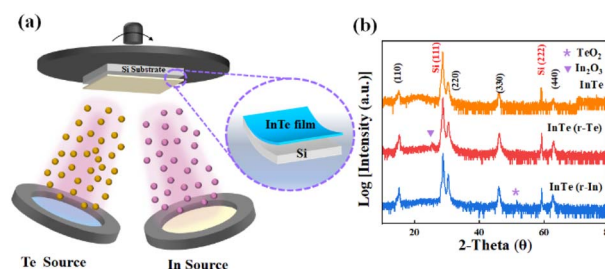
Md. Saidul Islam, Masahiro Fukuda, Md. Jakir Hossain, Nurun Nahar Rabin, Ryuta Tagawa, Mami Nagashima, Kenji Sadamasu, Kazuhisa Yoshimura, Yoshihiro Sekine, Terumasa Ikeda\* and Shinya Hayami\*



2418

### Controlling the terminal layer atom of InTe for enhanced electrochemical oxygen evolution reaction and hydrogen evolution reaction performance

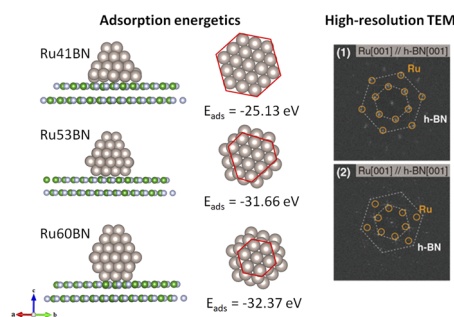
Jie Wu, Zhiyu Shao, Beining Zheng, Yuan Zhang, Xiangdong Yao, Keke Huang and Shouhua Feng\*



2422

### Morphology-dependent adsorption energetics of Ru nanoparticles on hcp-boron nitride (001) surface – a first-principles study

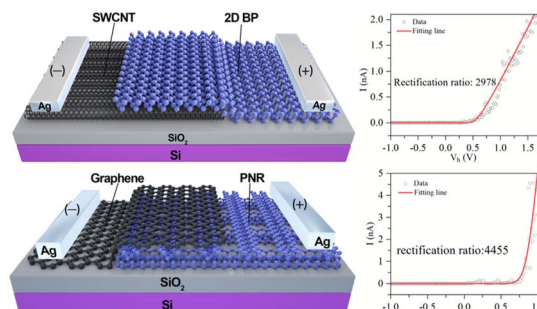
Thillai Govindaraja Senthamaraiannan, Chang Won Yoon\* and Dong-Hee Lim\*



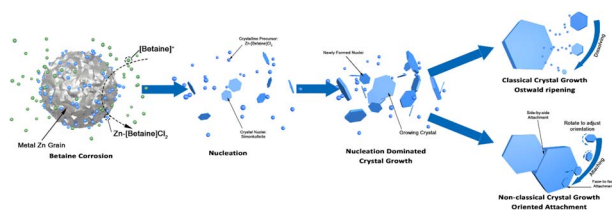
2427

### High-performance diodes based on black phosphorus/carbon nanomaterial heterostructures

Xiaowo Ye, Yanming Zhang, Shengguang Gao, Xiuzhi Zhao, Ke Xu, Long Wang, Shenghao Jiang, Fangyuan Shi, Jingyun Yang, Zhe Cao and Changxin Chen\*



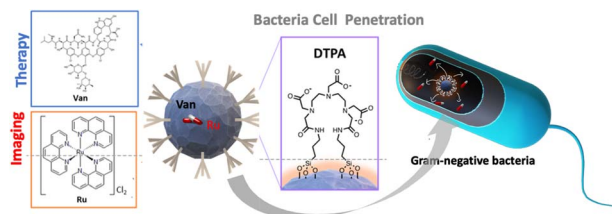
2437



### Controlling simonkolleite crystallisation *via* metallic Zn oxidation in a betaine hydrochloride solution

Shaoqing Qu, Eftychios Hadjittofis, Francisco Malaret, Jason Hallett, Rachel Smith and Kyra Sedransk Campbell\*

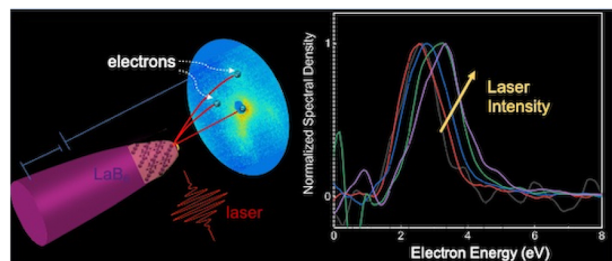
2453



### Chelating silica nanoparticles for efficient antibiotic delivery and particle imaging in Gram-negative bacteria

Asier R. Muguruza, Alessandro di Maio, Nikolas J. Hodges, Jessica M. A. Blair\* and Zoe Pikramenou\*

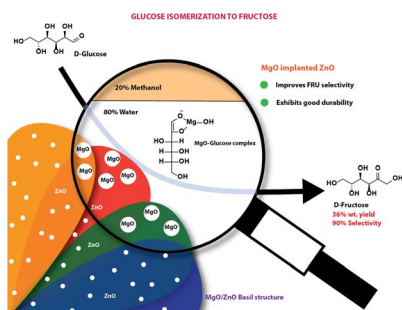
2462



### Bright and ultrafast electron point source made of LaB<sub>6</sub> nanopip

O. Borhade, B. Deconihout, I. Blum, S. Moldovan, J. Houard, A. Normand, K. Jagtap, M. More and A. Vella\*

2470



### Tuning of MgO's base characteristics by blending it with amphoteric ZnO facilitating the selective glucose isomerization to fructose for bioenergy development

Sangeeta Mahala, Senthil M. Arumugam, Sandeep Kumar, Bhawana Devi and Sasikummar Elumalai\*



2487

### One-pot synthesis of gamma-graphyne supported Pd nanoparticles with high catalytic activity

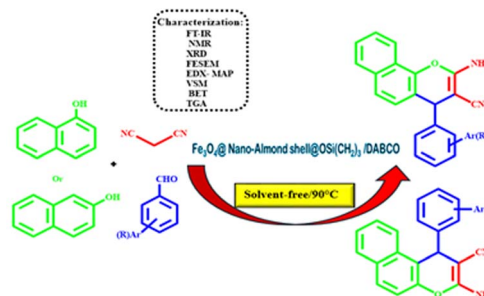
Shan He, Bin Wu,<sup>\*</sup> Ziwei Xia, Panxiang Guo, Yao Li and Shiqiang Song<sup>\*</sup>



2493

### Fe<sub>3</sub>O<sub>4</sub>@nano-almond shell@OSi(CH<sub>2</sub>)<sub>3</sub>/DABCO: a novel magnetic nanocatalyst for the synthesis of chromenes

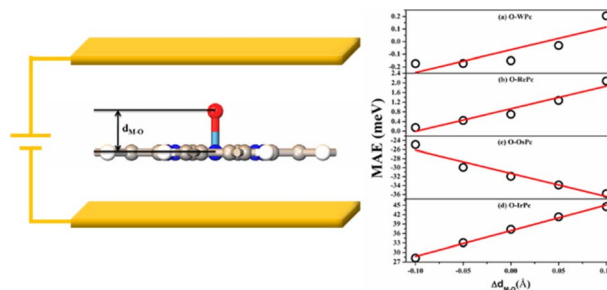
Mina Keihanfar, Bi Bi Fatemeh Mirjalili<sup>\*</sup> and Abdolhamid Bamoniri



2501

### Tuning magnetocrystalline anisotropy by controlling the orbital electronic configuration of two-dimensional magnetic materials

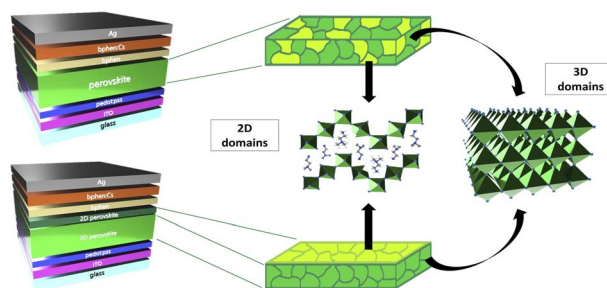
Xiaoxiao Guan, Yun Zhang, Xia Long, Guo-Jun Zhu<sup>\*</sup> and Juexian Cao<sup>\*</sup>



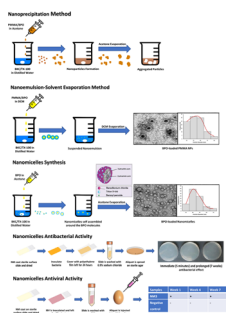
2508

### Role of a corrugated Dion–Jacobson 2D perovskite as an additive in 3D MAPbBr<sub>3</sub> perovskite-based light emitting diodes

C. T. Prontera,<sup>\*</sup> D. Taurino, A. Coriolano, A. Maggiore, M. Pugliese, R. Giannuzzi, F. Mariano, S. Carallo, A. Rizzo, G. Gigli, L. De Marco<sup>\*</sup> and V. Maiorano



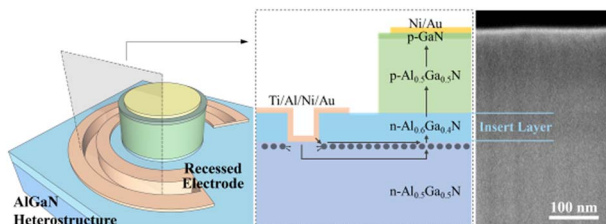
2517



### A novel long-acting antimicrobial nanomicelle spray

Mousa El-Sayed, Saif El-Din Al-Mofty, Noha Khalil Mahdy, Wessam Awad Sarhan\* and Hassan Mohamed El-Said Azzazy\*

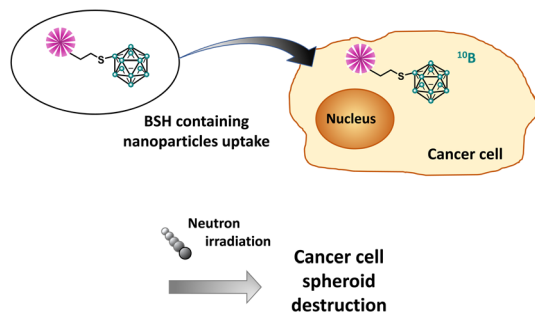
2530



### Optimizing metal/n-AlGaIn contact by recessed AlGaIn heterostructure with a polarization effect

Yuxuan Chen, Ke Jiang,\* Xiaojuan Sun, Zi-Hui Zhang, Shanli Zhang, Jianwei Ben, Bingxiang Wang, Long Guo and Dabing Li\*

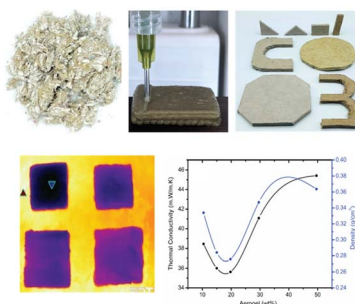
2537



### Organosilica nanoparticles containing sodium borocaptate (BSH) provide new prospects for boron neutron capture therapy (BNCT): efficient cellular uptake and enhanced BNCT efficacy

Mathilde Laird, Kotaro Matsumoto, Yuya Higashi, Aoi Komatsu, Art Raitano, Kendall Morrison, Minoru Suzuki and Fuyuhiko Tamanoi\*

2547



### Additive manufacturing of eco-friendly building insulation materials by recycling pulp and paper

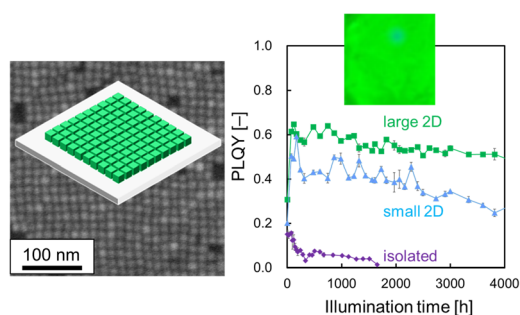
Meng-Lun Lee, Arpita Sarkar, Zipeng Guo, Chi Zhou, Jason N. Armstrong and Shenqiang Ren\*



2553

## Enhanced and stabilized photoluminescence of perovskite cesium lead bromide nanocubes through ordered assemblies

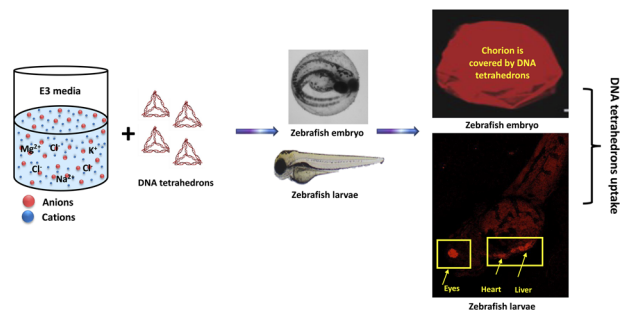
Moeka Sasaki, Shota Hashimoto, Yoshiki Iso, Yuya Oaki, Tetsuhiko Isobe and Hiroaki Imai\*



2558

## Spatiotemporal dynamics of DNA nanocage uptake in zebrafish embryos for targeted tissue bioimaging applications

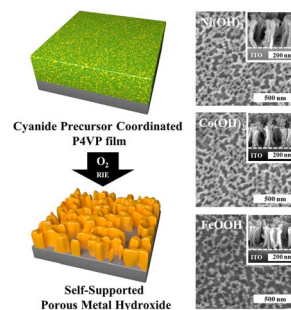
Krupa Kansara, Abdulkhalik Mansuri, Anjali Rajwar, Payal Vaswani, Ramesh Singh, Ashutosh Kumar and Dhiraj Bhatia\*



2565

## Facile synthesis of porous transition metal hydroxides from a poly(4-vinyl pyridine) film by controlling pH

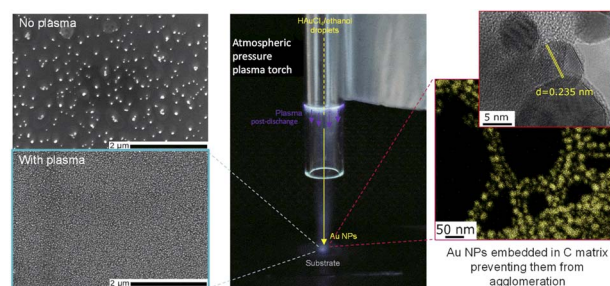
Gyeongwon Ha, Jaeyong Lee, Keon-Woo Kim, Chungryong Choi and Jin Kon Kim\*



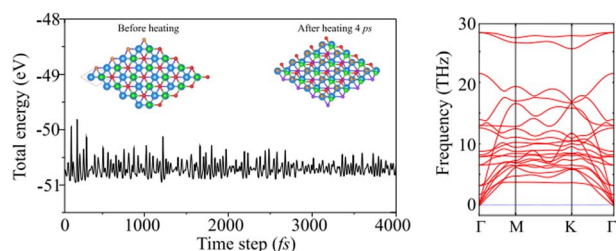
2573

## Gold nanoparticles synthesis and immobilization by atmospheric pressure DBD plasma torch method

Andjelika Bjelajac,\* Adrian-Marie Phillipe, Jérôme Guillot, Yves Fleming, Jean-Baptiste Chemin, Patrick Choquet and Simon Bulou



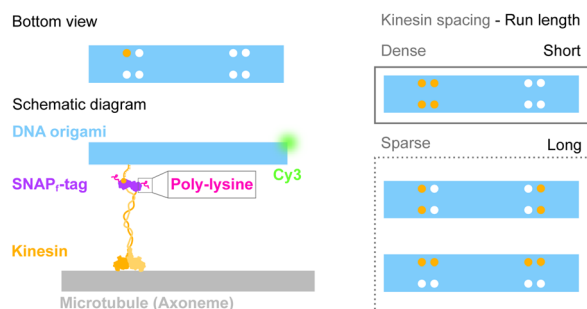
2583



### First-principles investigation of a type-II BP/Sc<sub>2</sub>CF<sub>2</sub> van der Waals heterostructure for photovoltaic solar cells

Nguyen Dang Khang, Cuong Q. Nguyen,\* Le M. Duc and Chuong V. Nguyen\*

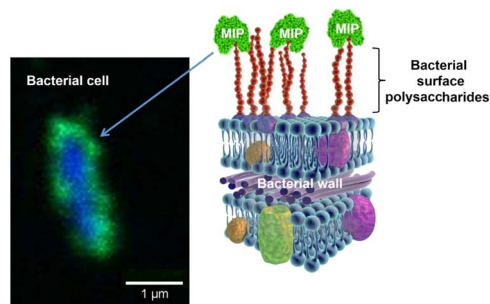
2590



### Evaluating the effect of two-dimensional molecular layout on DNA origami-based transporters

Kodai Fukumoto, Yuya Miyazono, Takuya Ueda, Yoshie Harada\* and Hisashi Tadakuma\*

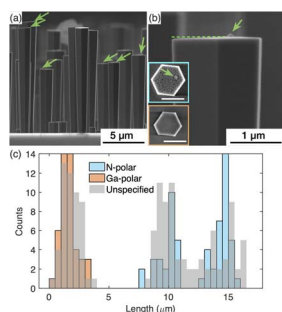
2602



### Molecularly imprinted nanoparticles for pathogen visualisation

Jaroslava Bezdekova, Francesco Canfarotta,\* Fabiana Grillo,\* Hasan Yesilkaya, Marketa Vaculovicova and Sergey Piletsky

2610



### Complications in silane-assisted GaN nanowire growth

Nian Jiang,\* Saptarsi Ghosh, Martin Frentrup, Simon M. Fairclough, Kagiso Loeto, Gunnar Kusch, Rachel A. Oliver and Hannah J. Joyce

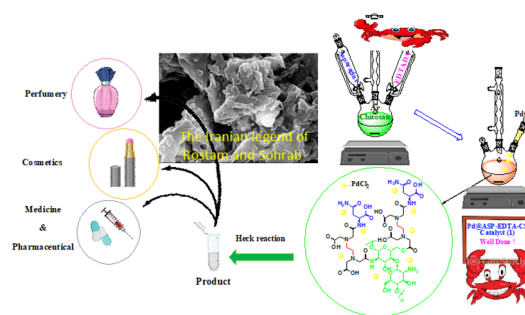




2621

### Pd@L-asparagine–EDTA–chitosan: a highly effective and reusable bio-based and biodegradable catalyst for the Heck cross-coupling reaction under mild conditions

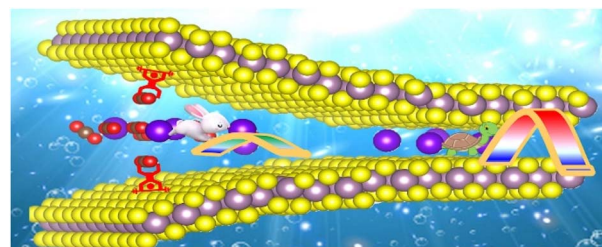
Mohammad Dohendou, Mohammad G. Dekamin\* and Danial Namaki



2639

### Molecular engineering on a MoS<sub>2</sub> interlayer for high-capacity and rapid-charging aqueous ion batteries

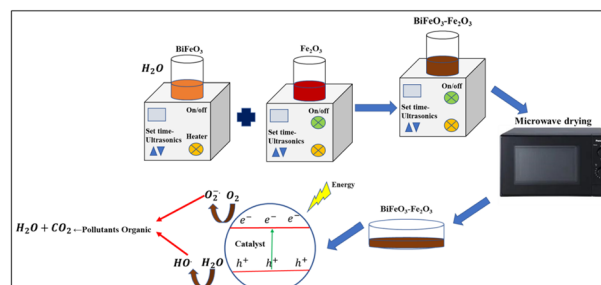
Xuefei Han, Jing Yang, Yong-Wei Zhang\* and Zhi Gen Yu\*



2646

### Single-phase BiFeO<sub>3</sub> and BiFeO<sub>3</sub>–Fe<sub>2</sub>O<sub>3</sub> nanocomposite photocatalysts for photodegradation of organic dye pollutants

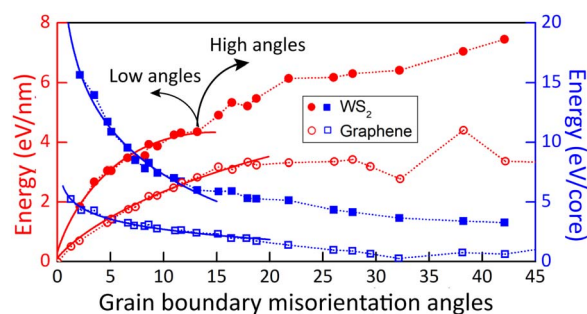
Pravallika Banoth, Boya Palajonnala Narsaiah, Luis De Los Santos Valladares,\* Jumat Kargin and Pratap Kollu\*



2657

### Tilt grain boundaries in WS<sub>2</sub> from low to high misorientation angles

Da Ke, Jinquan Hong and Yubo Zhang\*



2664

**Correction: Tuning the morphology of sulfur–few layer graphene composites *via* liquid phase evaporation for battery application**

Eleonora Venezia, Lorenzo Carbone,\* Francesco Bonaccorso and Vittorio Pellegrini

