

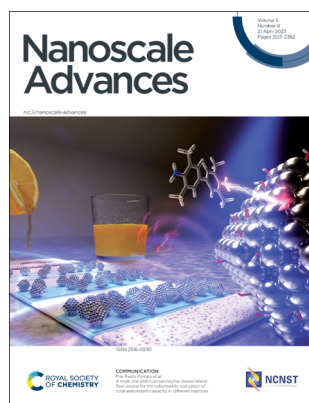
# Nanoscale Advances

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(8) 2123–2362 (2023)



**Cover**  
See Pier Paolo Pompa *et al.*, pp. 2167–2174. Image reproduced by permission of Pier Paolo Pompa from *Nanoscale Adv.*, 2023, 5, 2167.



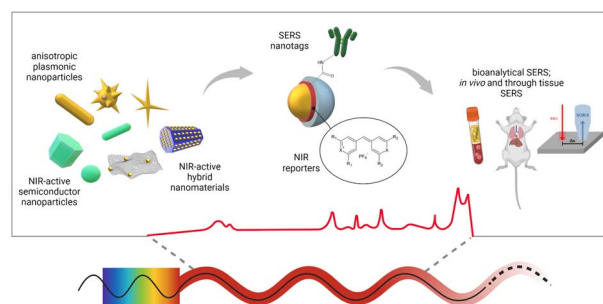
**Inside cover**  
See John X. J. Zhang *et al.*, pp. 2180–2189. Image reproduced by permission of John X. J. Zhang from *Nanoscale Adv.*, 2023, 5, 2180.

## REVIEW

2132

### Challenges and opportunities for SERS in the infrared: materials and methods

Chiara Deriu,\* Shaila Thakur, Olimpia Tamaro and Laura Fabris

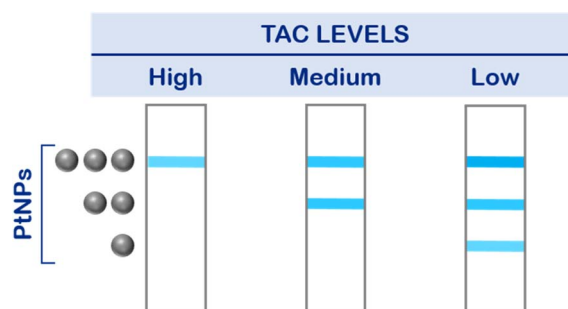


## COMMUNICATIONS

2167

### A multi-line platinum nanozyme-based lateral flow device for the colorimetric evaluation of total antioxidant capacity in different matrices

Anna Scarsi, Deborah Pedone and Pier Paolo Pompa\*



**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 Klinke, 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

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

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

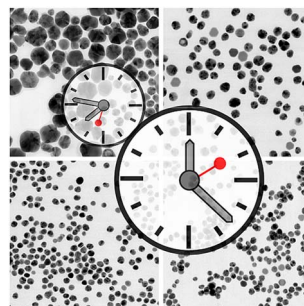


## COMMUNICATIONS

2175

**Time-domain Tollens reaction: synthesising silver nanoparticles with the formaldehyde clock**

Ronny Kürsteiner, Maximilian Ritter, Alla Sologubenko, Laura Stricker and Guido Panzarasa\*

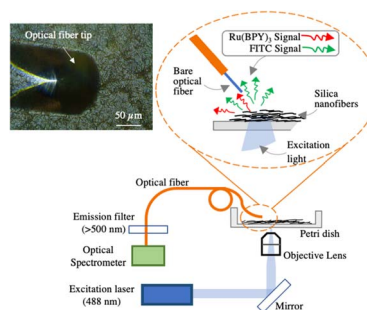


## PAPERS

2180

**Dual fluorescent hollow silica nanofibers for *in situ* pH monitoring using an optical fiber**

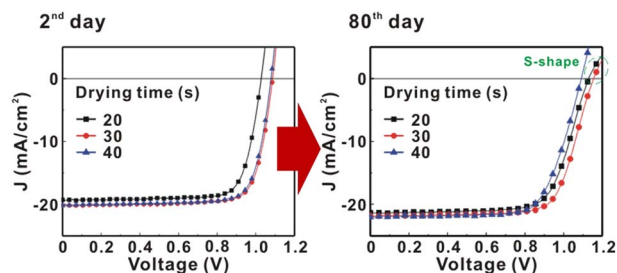
Junhu Zhou, Yundong Ren, Yuan Nie, Congran Jin, Jiyeon Park and John X. J. Zhang\*



2190

**Effects of drying time on the formation of merged and soft MAPbI<sub>3</sub> grains and their photovoltaic responses**

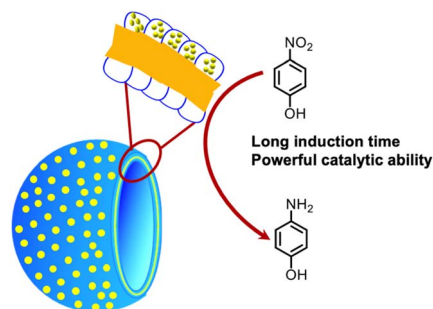
Anjali Chandel, Qi Bin Ke, Shou-En Chiang, Hsin-Ming Cheng\* and Sheng Hsiung Chang\*



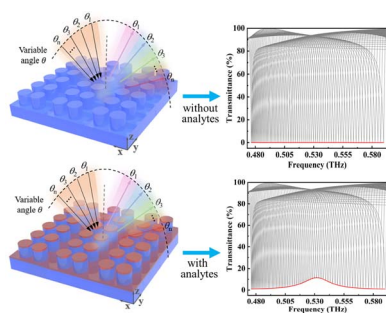
2199

**Generation of sub-5 nm AuNPs in the special space of the loop-cluster corona of a polymer vesicle: preparation and its unique catalytic performance in the reduction of 4-nitrophenol**

Wen-Li Wang, Ayaka Kanno, Amika Ishiguri and Ren-Hua Jin\*



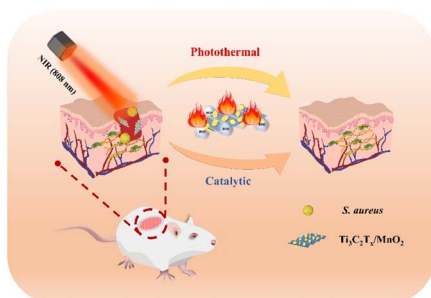
2210



### A terahertz metasurface sensor with fingerprint enhancement in a wide spectrum band for thin film detection

Xuan Zhang, Jianjun Liu and Jianyuan Qin\*

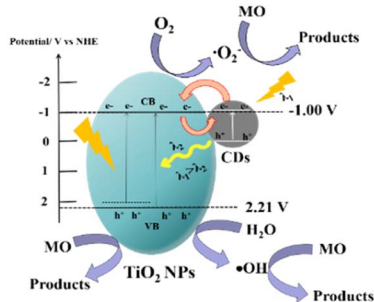
2216



### Synthesis of $\text{Ti}_3\text{C}_2\text{T}_x/\text{MnO}_2$ composites for synergistic catalytic/photothermal-based bacterial inhibition

Ting Hu, Zhilong Xu, Peiying Zhang, Lei Fan,\* Juqun Xi,\* Jie Han and Rong Guo

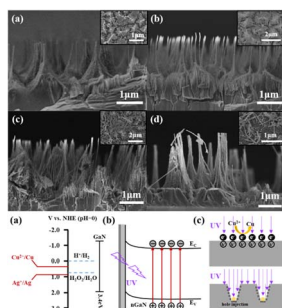
2226



### Kilogram-scale fabrication of $\text{TiO}_2$ nanoparticles modified with carbon dots with enhanced visible-light photocatalytic activity

Jingjing Xu, Jiayan Zhang, Feifei Tao,\* Pengfei Liang and Pingan Zhang

2238



### GaN nanowires prepared by Cu-assisted photoelectron-chemical etching

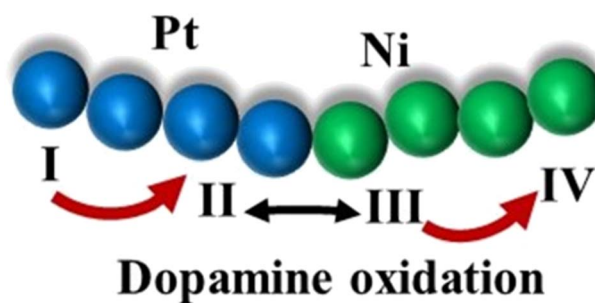
Qi Wang,\* Wen Yang, Sheng Gao, Weizhong Chen, Xiaosheng Tang, Hongsheng Zhang, Bin Liu, Genquan Han and Yi Huang\*



2244

### Au–Pt–Ni nanochains as dopamine catalysts: role of elements and their spatial distribution

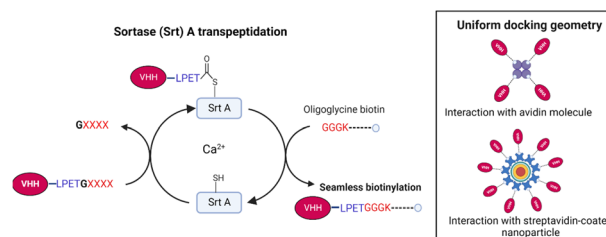
Hua Fan, William Le Boeuf and Vivek Maheshwari\*



2251

### Sortase A transpeptidation produces seamless, unbranched biotinylated nanobodies for multivalent and multifunctional applications

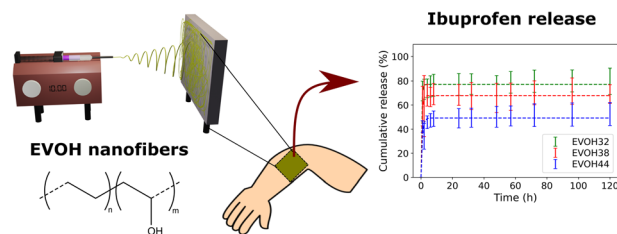
Eugene M. Obeng, David L. Steer, Alex J. Fulcher and Kylie M. Wagstaff\*



2261

### Ibuprofen-loaded electrospun poly(ethylene-co-vinyl alcohol) nanofibers for wound dressing applications

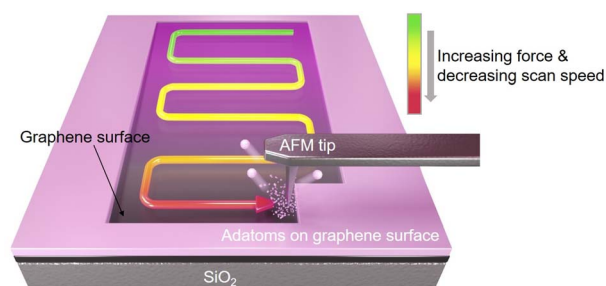
Jean Schoeller, Karin Wuertz-Kozak, Stephen J. Ferguson, Markus Rottmar, Jonathan Avaro, Yvonne Elbs-Glatz, Michael Chung and René M. Rossi\*



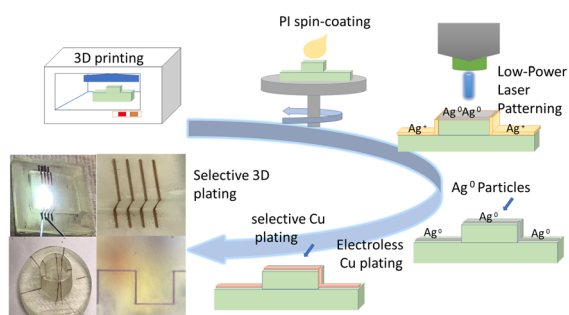
2271

### Chemical gradients on graphene *via* direct mechanochemical cleavage of atoms from chemically functionalized graphene surfaces

Hyeonsu Kim, Dong-Hyun Kim, Yunjo Jeong, Dong-Su Lee, Jangyup Son\* and Sangmin An\*



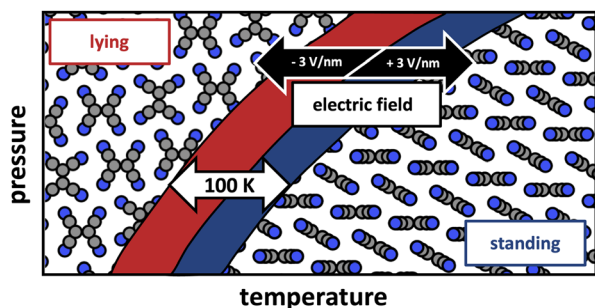
2280



### Low-power laser manufacturing of copper tracks on 3D printed geometry using liquid polyimide coating

Mansour Abdulrhman, Adarsh Kaniyoor, Carmen M. Fernández-Posada, Pablo Acosta-Mora, Ian McLean, Nick Weston, Marc P. Y. Desmulliez and Jose Marques-Hueso\*

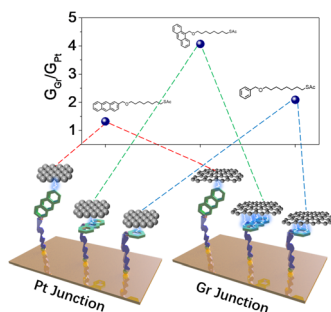
2288



### Polymorphism mediated by electric fields: a first principles study on organic/inorganic interfaces

Johannes J. Cartus, Andreas Jeindl, Anna Werkovits, Lukas Hörmann and Oliver T. Hofmann\*

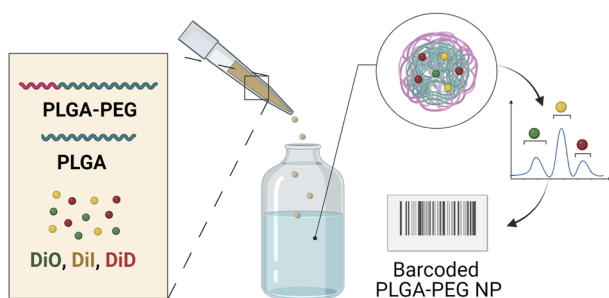
2299



### Planar aromatic anchors control the electrical conductance of gold|molecule|graphene junctions

Luke J. O'Driscoll, Michael Jay, Benjamin J. Robinson, Hatem Sadeghi, Xintai Wang, Becky Penhale-Jones, Martin R. Bryce\* and Colin J. Lambert\*

2307



### Identification of fluorescently-barcoded nanoparticles using machine learning

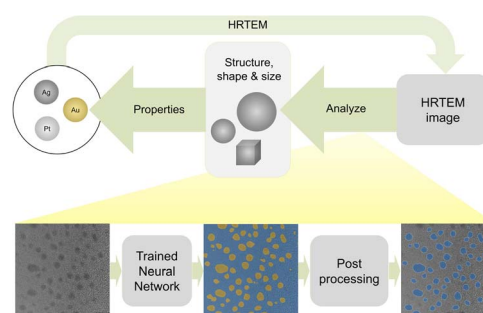
Ana Ortiz-Perez, Cristina Izquierdo-Lozano, Rens Meijers, Francesca Grisoni and Lorenzo Albertazzi\*



2318

## Automated analysis of transmission electron micrographs of metallic nanoparticles by machine learning

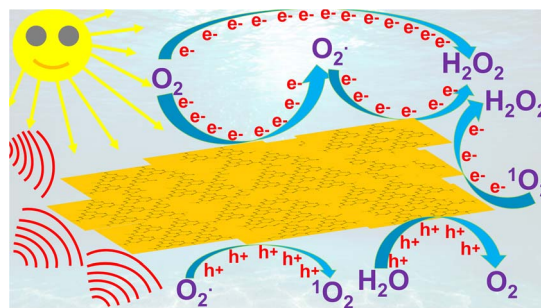
Nina Gumbiowski, Kateryna Loza, Marc Heggen and Matthias Eppe<sup>\*</sup>



2327

## Revisiting the roles of dopants in g-C<sub>3</sub>N<sub>4</sub> nanostructures for piezo-photocatalytic production of H<sub>2</sub>O<sub>2</sub>: a case study of selenium and sulfur

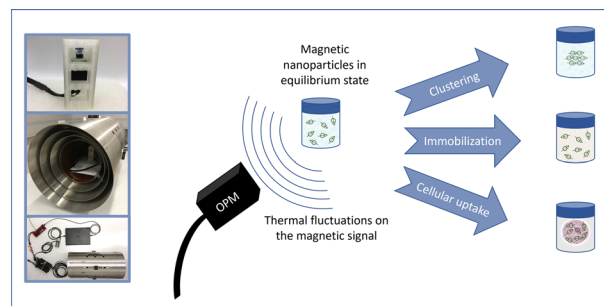
Dat Do Tran, Hoai-Thanh Vuong, Duc-Viet Nguyen, Pho Phuong Ly, Pham Duc Minh Phan, Vu Hoang Khoi, Phong Thanh Mai and Nguyen Huu Hieu<sup>\*</sup>



2341

## Monitoring magnetic nanoparticle clustering and immobilization with thermal noise magnetometry using optically pumped magnetometers

Katrijn Everaert,<sup>\*</sup> Tilmann Sander, Rainer Körber, Norbert Löwa, Bartel Van Waeyenberge, Jonathan Leliaert and Frank Wiekhorst



2352

## Exploring the untapped catalytic application of a ZnO/CuI/PPy nanocomposite for the green synthesis of biologically active 2,4,5-trisubstituted imidazole scaffolds

Sahil Kohli, Nisha, Garima Rathee, Sunita Hooda<sup>\*</sup> and Ramesh Chandra<sup>\*</sup>

