

Nanoscale Advances

An open access journal publishing across the breadth of nanoscience and nanotechnology
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.

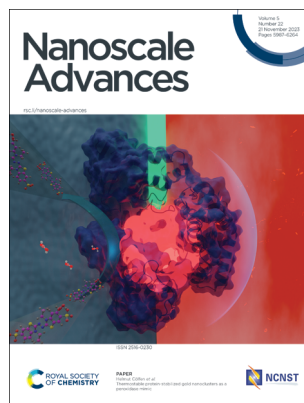
IN THIS ISSUE

ISSN 2516-0230 CODEN NAADAI 5(22) 5987–6264 (2023)



Cover

See Pedro Henrique de Oliveira Neto *et al.*, pp. 6053–6060. Image reproduced by permission of Pedro Henrique de Oliveira Neto from *Nanoscale Adv.*, 2023, 5, 6053.



Inside cover

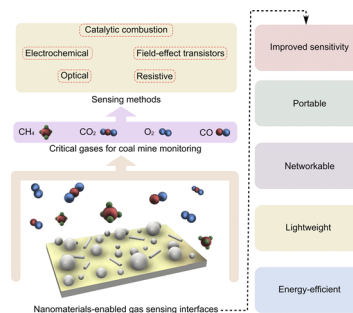
See Helmut Cölfen *et al.*, pp. 6061–6068. Image reproduced by permission of Özlem Akyüz from *Nanoscale Adv.*, 2023, 5, 6061.

REVIEWS

5997

Gas nanosensors for health and safety applications in mining

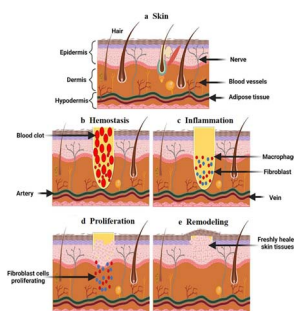
Mahroo Baharfar,* Jiancheng Lin, Mohamed Kilani, Liang Zhao, Qing Zhang and Guangzhao Mao*



6017

Research progress related to thermosensitive hydrogel dressings in wound healing: a review

Ruting Gu, Haiqing Zhou, Zirui Zhang, Yun Lv, Yueshuai Pan, Qianqian Li, Changfang Shi, Yanhui Wang* and Lili Wei*



Editorial Staff

Executive Editor

Jeremy Allen

Deputy Editor

Hannah Kerr

Editorial Assistant

Rosie Hague

Editorial Production Manager

Daniella Ferluccio

Assistant Editors

Zita Zachariah, Serra Arslan Sengelen and Zifei Lu

Publisher

Neil Hammond

For queries about submitted papers, please contact Daniella Ferluccio, Editorial Production Manager in the first instance. E-mail: nanoscaleadvances-rsc@rsc.org

For pre-submission queries please contact Jeremy Allen, Executive Editor. E-mail: 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 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

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 Advances

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

Honorary Editor-in-chief

Chunli Bai, National Centre for Nanoscience and Nanotechnology, China

Editors-in-chief

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

Yue Zhang, University of Science and Technology Beijing, China

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

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

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

Mingdong Dong, Aarhus University, Denmark

Kristen Fichthorn, Penn State University, USA

Christy Haynes, University of Minnesota, USA

Niko Hildebrandt, Université de Rouen Normandie / Seoul National University, France / South Korea

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

Kourosh 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

Xing Yi Ling, Nanyang Technological University, Singapore

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

Umesh 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

Xiaojun 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

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

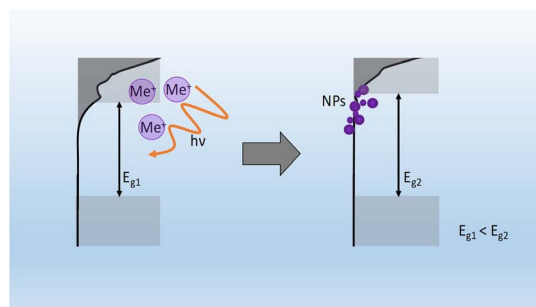


COMMUNICATIONS

6038

New insights into the influence of plasmonic and non-plasmonic nanostructures on the photocatalytic activity of titanium dioxide

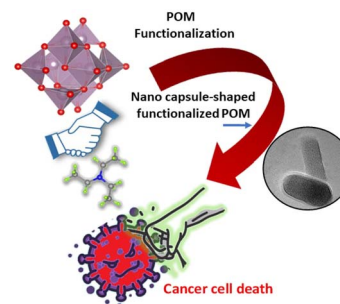
Anna Jakimińska, Kaja Spilarewicz and Wojciech Macyk*



6045

A polyoxomolybdate-based hybrid nano capsule as an antineoplastic agent

Arti Joshi, Sobhna Acharya, Neeta Devi, Ruby Gupta, Deepika Sharma and Monika Singh*

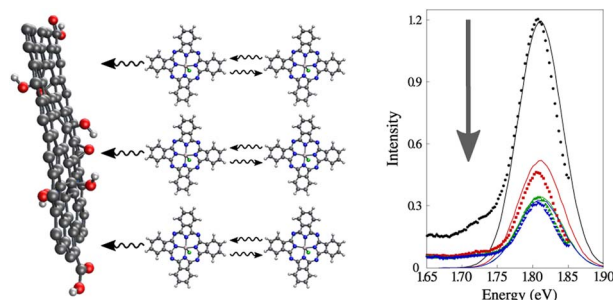


PAPERS

6053

Modelling the quenching effect of chloroaluminum phthalocyanine and graphene oxide interactions: implications for phototherapeutic applications

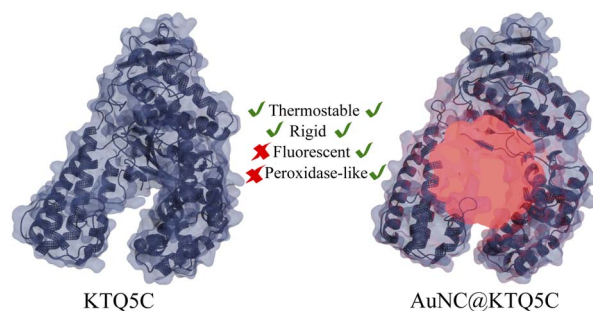
Fernando Teixeira Bueno, Leonardo Evaristo de Sousa, Leonardo Giordano Paterno, Alan Rocha Baggio, Demétrio Antônio da Silva Filho and Pedro Henrique de Oliveira Neto*



6061

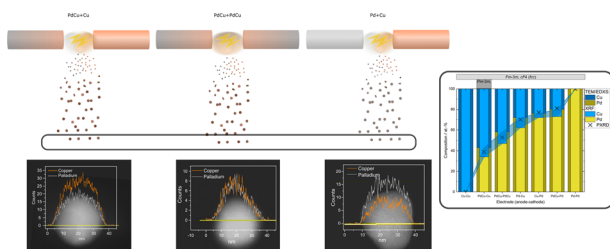
Thermostable protein-stabilized gold nanoclusters as a peroxidase mimic

Özlem Akyüz, Maite Miñun, Rose Rosenberg, Martin Scheffner, Andreas Marx and Helmut Cölfen*



PAPERS

6069

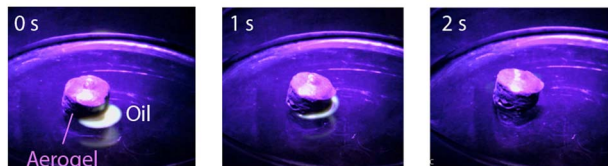


Compositional tuning of gas-phase synthesized Pd–Cu nanoparticles

Sara M. Franzén,^{*} Linnéa Jönsson, Pau Ternero, Monica Kåredal, Axel C. Eriksson, Sara Blomberg, Julia-Maria Hübner and Maria E. Messing

6078

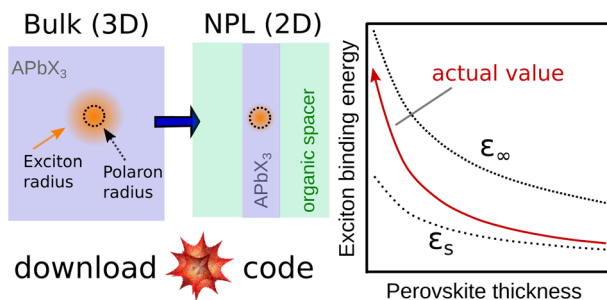
Oil Absorption from Water by Silk Fibroin-Graphene Oxide Aerogel



Graphene oxide nanosheets augment silk fibroin aerogels for enhanced water stability and oil adsorption

Catherine E. Machnicki, Eric M. DuBois, Meg Fay, Snehi Shrestha, Zachary S. S. L. Saleeba, Alex M. Hruska, Zahra Ahmed, Vikas Srivastava, Po-Yen Chen and Ian Y. Wong^{*}

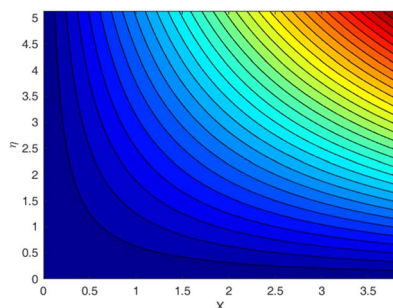
6093



Excitons in metal halide perovskite nanoplatelets: an effective mass description of polaronic, dielectric and quantum confinement effects

Jose L. Movilla, Josep Planelles and Juan I. Climente^{*}

6102



Viscoelastic fluid flow over a horizontal flat plate with various boundary slip conditions and suction effects

K. Sudarmozhi, D. Iranian, M. Asif Memon, P. D. Selvi, M. Sabeel Khan and Amsalu Fenta^{*}

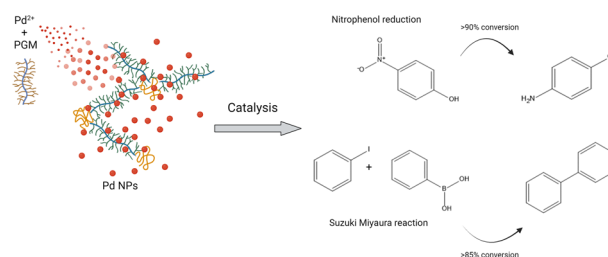


PAPERS

6115

One-pot green bio-assisted synthesis of highly active catalytic palladium nanoparticles in porcine gastric mucin for environmental applications

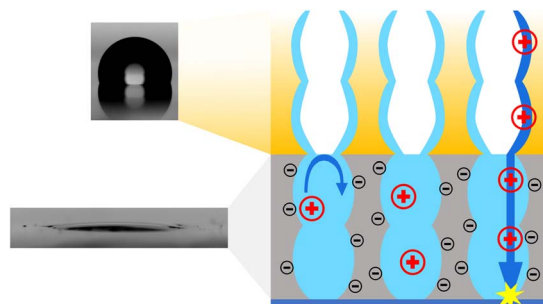
Roman Nudelman, Shir Zurets, Meiron Lev, Shira Gavriely, Louisa Meshi, Ines Zucker and Shachar Richter*



6123

Molecular transport and water condensation inside mesopores with wettability step gradients

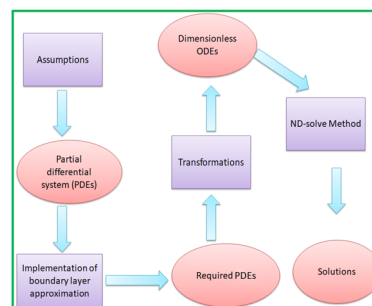
Laura Despot, Chirag Hinduja, Robert Lehn, Joanna Mikolei, Timo Richter, Kilian Köbschall, Mathias Stanzel, Rüdiger Berger, Jeanette Hussong, Marcelo Ceolín and Annette Andrieu-Brunsen*



6135

KHA model comprising MoS_4 and CoFe_2O_3 in engine oil invoking non-similar Darcy–Forchheimer flow with entropy and Cattaneo–Christov heat flux

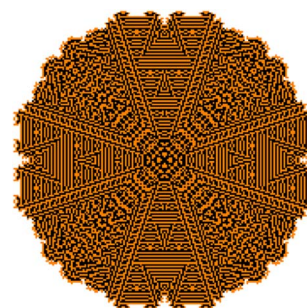
Sohail A. Khan,* T. Hayat and A. Alsaedi



6148

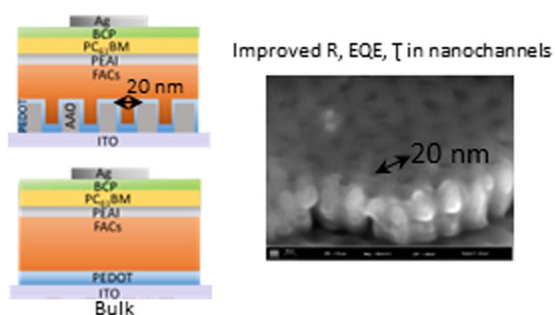
Computational assessment of the potential of cross-catalytic coprecipitating systems for the bottom-up design of nanocomposites

Joti Rouillard,* Britta Maier, Helmut Cölfen and Juan-Manuel García-Ruiz*



PAPERS

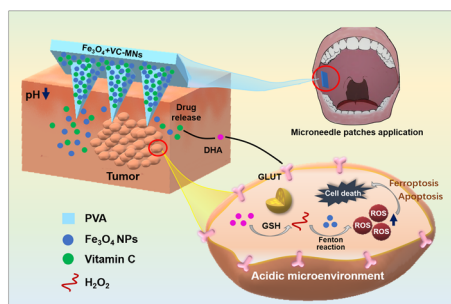
6155



Structured hybrid photodetectors using confined conducting polymer nanochannels

Sukanya Das, K. H. Girish, N. Ganesh and K. S. Narayan*

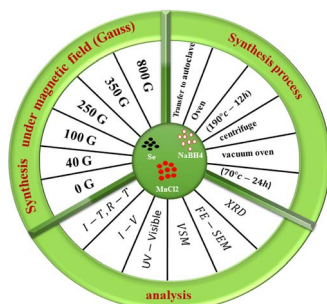
6162



A tumor microenvironment-responsive microneedle patch for chemodynamic therapy of oral squamous cell carcinoma

Siyu Zhao, Yue Li and Bo Cheng*

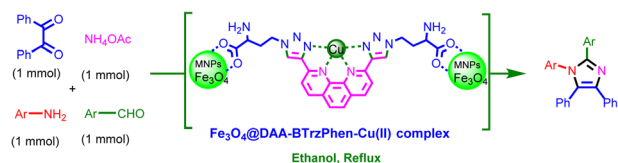
6170



Magnetic field effects on the crystal structure, morphology, energy gap, and magnetic properties of manganese selenide nanoparticles synthesized by hydrothermal method

Ali Salmani Nokabadi and Ahmad Yazdani*

6177



Synthesis of a bistriazolyl-phenanthroline-Cu(II) complex immobilized on nanomagnetic iron oxide as a novel green catalyst for synthesis of imidazoles via annulation reactions

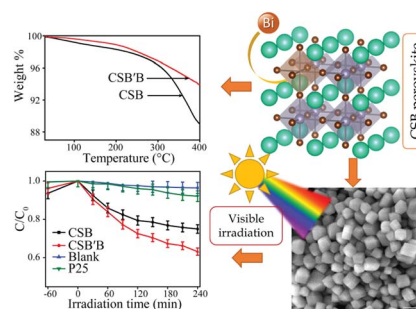
Raed H. Althomali, Ebraheem Abdu Musad Saleh,* Riyadh Hasan Mohammed Ali, Ikromjon Ilkhomidinovich Mamadoliev, Montather F. Ramadan, Ashwaq Talib Kareem, Saurabh Aggarwal and Salema K. Hadrawi



6194

Tuning the morphology, stability and optical properties of CsSnBr₃ nanocrystals through bismuth doping for visible-light-driven applications

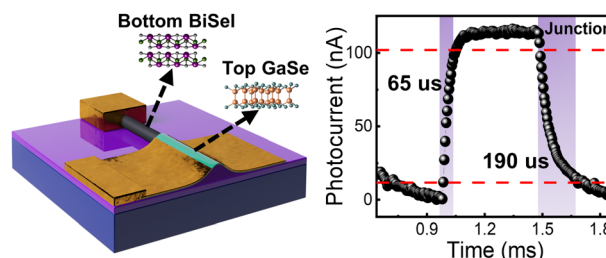
Md. Asif Adib, Fahmida Sharmin and M. A. Basith*



6210

A mixed-dimensional quasi-1D BiSeI nanowire-2D GaSe nanosheet p–n heterojunction for fast response optoelectronic devices

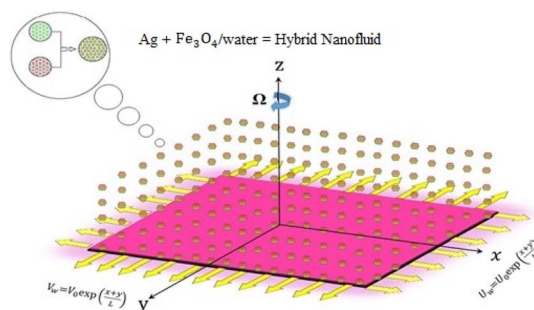
Huijie Hu, Weili Zhen, Zhilai Yue, Rui Niu, Feng Xu, Wanli Zhu, Keke Jiao, Mingsheng Long, Chuanying Xi,* Wenka Zhu* and Changjin Zhang*



6216

Thermal analysis of micropolar hybrid nanofluid inspired by 3D stretchable surface in porous media

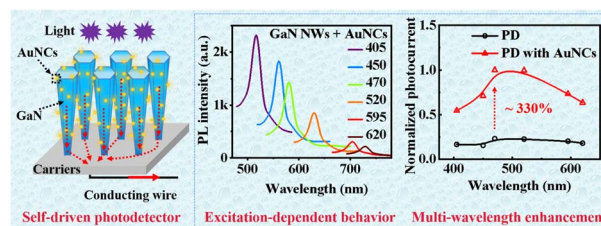
Aisha M. Alqahtani, Basharat Ullah, Bilal Ahmad, Umar Khan,* Hafiz Abdul Wahab and Roobaea Alroobaea



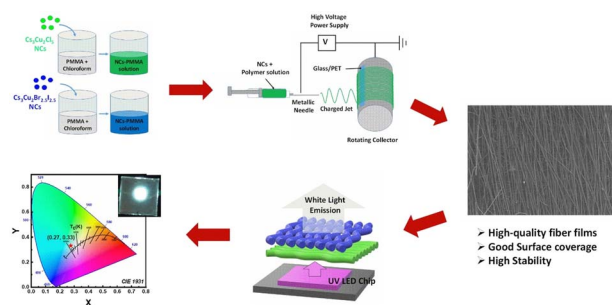
6228

Engineering GaN/AuNC core–shell nanowire heterojunctions by gold nanoclusters with excitation-dependent behavior for enhancing the responsivity and stability of self-driven photodetectors

Yuanyuan Huang, Jianya Zhang, Min Zhou, Renjun Pei* and Yukun Zhao*



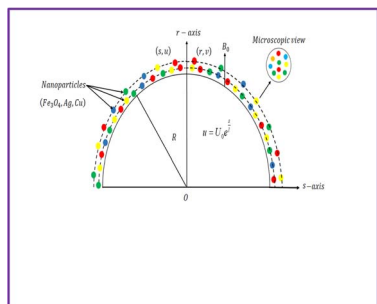
6238



Stable and luminescent cesium copper halide nanocrystals embedded in flexible polymer fibers for fabrication of down-converting WLEDs

Manav Raj Kar, Kajol Sahoo, Ashutosh Mohapatra and Saikat Bhaumik*

6249



A numerical study on the flow of water-based ternary hybrid nanomaterials on a stretchable curved sheet

W. Shinwari,* T. Hayat, Z. Abbas and S. Momani

