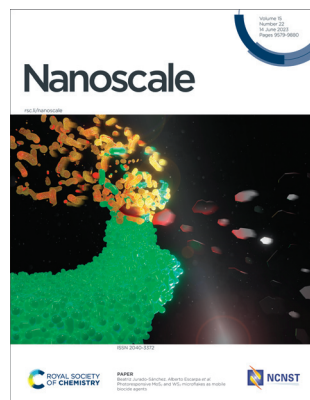


IN THIS ISSUE

ISSN 2040-3372 CODEN NANOHL 15(22) 9579-9880 (2023)



Cover

See Beatriz Jurado-Sánchez, Alberto Escarpa *et al.*, pp. 9675–9683.

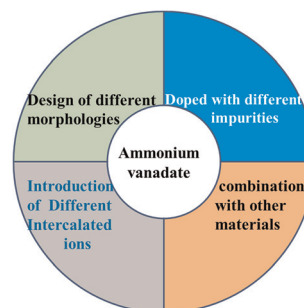
Image reproduced by permission of Alberto Escarpa and Víctor de la Asunción of University of Alcalá from *Nanoscale*, 2023, **15**, 9675.

REVIEWS

9589

Improved strategies for ammonium vanadate-based zinc ion batteries

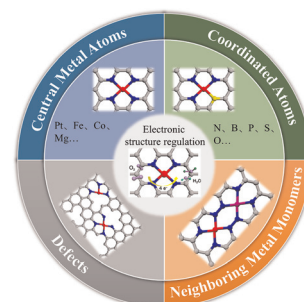
Le Li,* Shaofeng Jia, Zhiyi Cheng and Changming Zhang*



9605

Carbon-based single-atom catalysts: impacts of atomic coordination on the oxygen reduction reaction

Zhiwen Kang, Xiaochen Wang, Dan Wang, Bing Bai, Yafei Zhao, Xu Xiang, Bing Zhang* and Huishan Shang*



Editorial Staff

Executive Editor

Michaela Mühlberg

Managing Editor

Heather Montgomery

Editorial Production Manager

Jonathon Watson

Senior Publishing Editor

Daniella Ferlucio

Development Editor

Edward Gardner

Publishing Editors

Matthew Blow, Chris Dias, Hemna Fathima, Juan Gonzalez, Eleanor Griffiths, Rob Hinde, Ash Hyde, Sam Howell, Francesca Jacklin, Shruti Karnik, Sophie Koh, Tamara Kosikova, Evie Karkera, Brian Li, Sam Mansell, Carole Martin, Kirsty McRoberts, Cat Schofield, Charu Storr-Vijay, Manman Wang, Tom Williams, Ella White

Editorial Assistant

Elizabeth So

Publishing Assistant

Lee Colwill

Assistant Editor

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: nanoscale@rsc.org

For pre-submission queries please contact Michaela Mühlberg, Executive Editor. E-mail: nanoscale-rsc@rsc.org
Nanoscale (electronic: ISSN 2040-3372) is published 48 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

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 0WF, UK

Tel +44 (0)1223 432398; E-mail orders@rsc.org

2023 Annual (electronic) subscription price: £1936/\$3155.

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

rsc.li/nanoscale

Nanoscale 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 Cuniberti, TU Dresden (Technische Universität Dresden), Germany
Qing Dai, National Center for Nanoscience and Technology of China, China
Yves Dufrène, Université Catholique de Louvain, Belgium

Andrea Ferrari, University of Cambridge, UK
Dong Ha Kim, Ewha Womens University, South 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
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, Jawaharlal Nehru Centre for Advanced Scientific Research, India
Manzhou Zhu, Anhui University, China
Jin Zou, The University of Queensland, Australia

Advisory Board

Zhenan Bao, Stanford University, USA
Amanda Barnard, Australian National University, Australia
Suryasarathi Bose, Indian Institute of Science Bangalore, India
Stephanie Brock, Wayne State University, USA
Raffaella Buonsanti, EPFL, Switzerland
Chunying Chen, National Center for Nanoscience and Technology of China, China
Jingyi Chen, University of Arkansas, USA
Wenlong Chen, Monash University, Australia
Xiaodong Chen, Nanyang Technological University, Singapore
Serena Cussen, University of Sheffield, UK
Mita Dasg, Dalhousie University, Canada
Kristen Fichtorn, 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
Kourosh Kalantar-zadeh, The University of Sydney, Australia
Yamuna Krishnan, University of Chicago, USA
Katharina Landfester, Max Planck Institute for Polymer Research, Germany
Pooi See Lee, Nanyang Technological University, Singapore
Graham Leggett, The University of Sheffield, UK
Changming Li, Southwest University, China

Jie Liu, Duke University, USA
Laura Na Liu, Max Planck Institute for Intelligent Systems, Germany
Yunqi Liu, Institute of Chemistry, Chinese Academy of Sciences, China
Wei Lu, University of Michigan, USA
Liberato Manna, Istituto Italiano di Tecnologia, Italy
Anna Fontcuberta i Morral, EPFL, Switzerland
Catherine Murphy, University of Illinois at Urbana-Champaign, USA
Kostya (Ken) Ostrikov, Queensland University of Technology, Australia
So-Jung Park, Ewha Womens University, Korea
T Pradeep, Indian Institute of Technology Madras, India
Lakshmi Polavarapu, University of Vigo, Spain
Narayan Pradhan, Indian Association for the Cultivation of Science, India
Dong Qin, Georgia Institute of Technology, USA
Paolo Samori, Université de Strasbourg, France
Michael Sailor, University of California, San Diego, USA
Zhigang Shuai, Tsinghua University, China
Sara Skrabalak, Indiana University, USA
Francesco Stellacci, EPFL, Switzerland
Hong-Bo Sun, Jilin University, China
Ling-Dong Sun, Peking 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 Nano, 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, China
Jinhua Ye, National Institute for Materials Science, Japan
Xiao Cheng Zeng, University of Nebraska-Lincoln, USA
Gang Zhang, Agency for Science, Technology and Research, Singapore
Hua Zhang, City University of Hong Kong, China
Miqin Zhang, University of Washington, USA
Yuliang Zhao, National Center for Nanoscience and Technology, China

Information for Authors

Full details on how to submit material for publication in Nanoscale 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

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

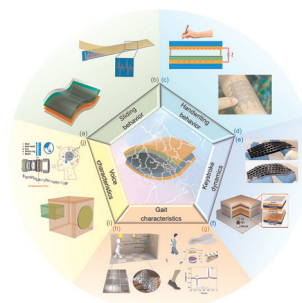


REVIEWS

9635

Triboelectric nanogenerators as self-powered sensors for biometric authentication

Xue Shi, Kai Han, Yaokun Pang, Wenjie Mai* and Jianjun Luo*

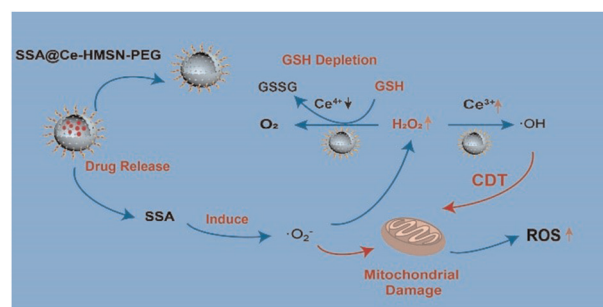


COMMUNICATIONS

9652

Reactive oxygen species nanoamplifiers with multi-enzymatic activities for enhanced tumor therapy

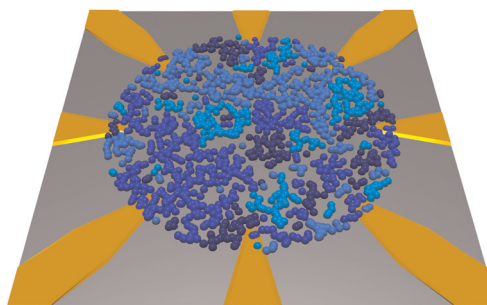
Shasha Zhao, Kexin Lai, Zhen Gao, Xueli Ye, Juan Mou, Shiping Yang and Huixia Wu*



9663

Reservoir computing using networks of memristors: effects of topology and heterogeneity

J. B. Mallinson, Z. E. Heywood, R. K. Daniels, M. D. Arnold, P. J. Bones and S. A. Brown*

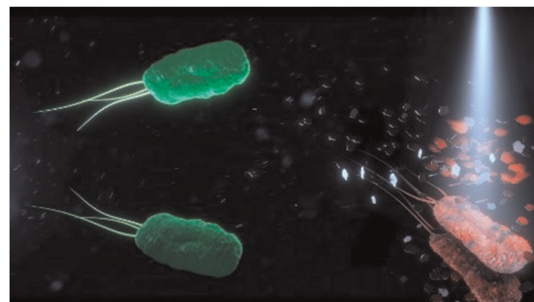


PAPERS

9675

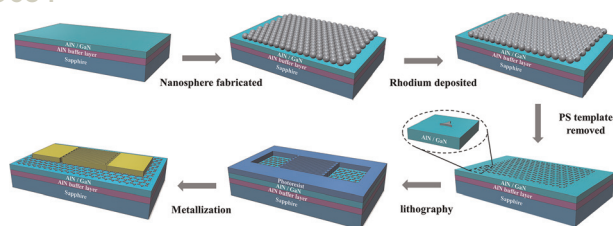
Photoresponsive MoS₂ and WS₂ microflakes as mobile biocide agents

V́ctor de la Asunci3n-Nadal, Javier Bujalance-Fernández, Beatriz Jurado-Sánchez* and Alberto Escarpa*



PAPERS

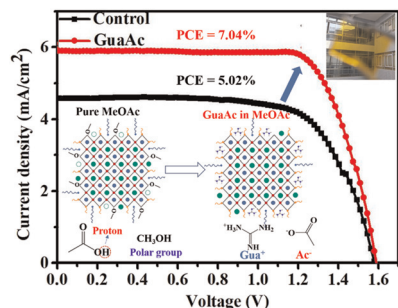
9684



Rhodium-embedded UV photodetectors based on localized surface plasmon resonance on AlN/GaN

Xun Hu, Baiyi Chen, Changfeng Huang, Hongwei Qiu, Na Gao,* Yaping Wu, Duanjun Cai, Kai Huang,* Junyong Kang and Rong Zhang

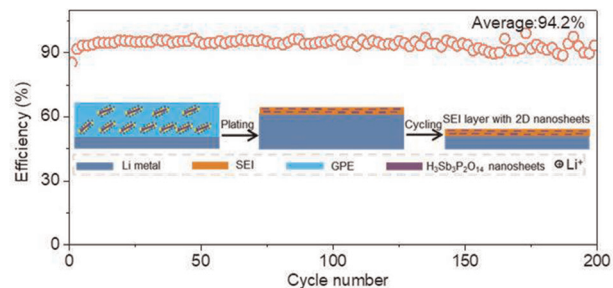
9691



Tailoring multifunctional anions to inhibit methanol absorption on a CsPbBr₃ quantum dot surface for highly efficient semi-transparent photovoltaics

Yinyan Xu, Pujun Niu, Lun Zhang, Ziying Wen, Sheng Cheng, Mei Lyu and Jun Zhu*

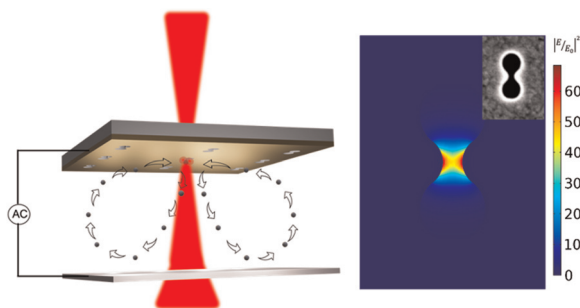
9700



A quasi-solid polymer electrolyte initiated by two-dimensional functional nanosheets for stable lithium metal batteries

Ying Zhang, Jiawen Huang, Guanyao Wang, Yuhai Dou, Ding Yuan, Liangxu Lin, Kuan Wu,* Hua Kun Liu, Shi-Xue Dou and Chao Wu*

9710



High-speed nanoscale optical trapping with plasmonic double nanohole aperture

Theodore Anyika, Chuchuan Hong and Justus C. Ndukaife*

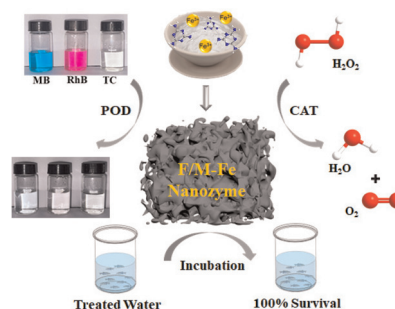


PAPERS

9718

Fe₃N-decorated porous carbon frameworks from wheat flour with dual enzyme-mimicking activities for organic pollutant degradation

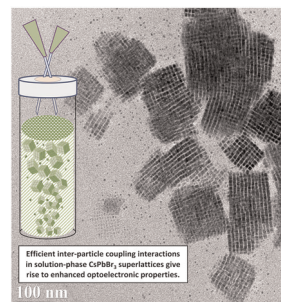
Qi Fang, Quanyi Liu, Yu Zhang and Yan Du*



9728

Promoting solution-phase superlattices of CsPbBr₃ nanocrystals

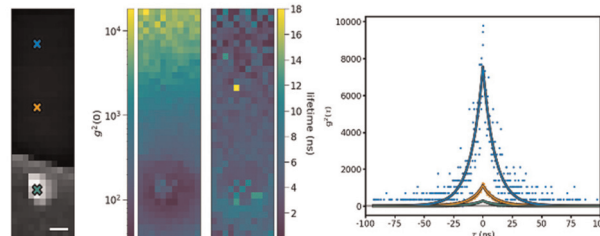
Noel Mireles Villegas, Josue C. Hernandez, Joshua C. John and Matthew Sheldon*



9738

Photon bunching in cathodoluminescence induced by indirect electron excitation

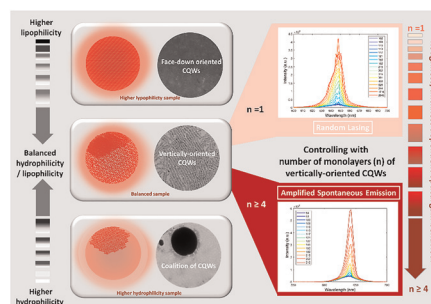
Vasudevan Iyer, Kevin Roccapiore, Jacob Ng, Bernadeta Srijanto, David Lingerfelt and Benjamin Lawrie*



9745

Vertically oriented self-assembly of colloidal CdSe/CdZnS quantum wells controlled via hydrophilicity/lipophilicity balance: optical gain of quantum well stacks for amplified spontaneous emission and random lasing

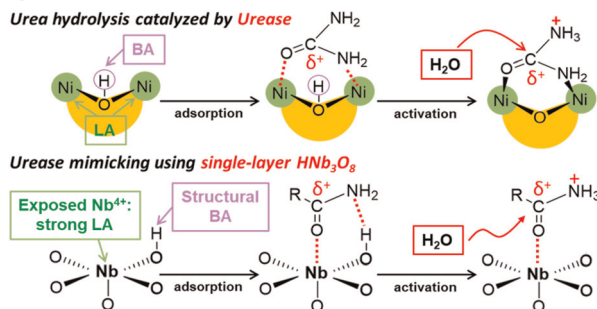
Zeynep Dikmen, Ahmet Tarık Işık, İklim Bozkaya, Hamed Dehghanpour Baruj, Betül Canımkuşbey, Farzan Shabani, Muhammad Ahmad and Hilmi Volkan Demir*



PAPERS

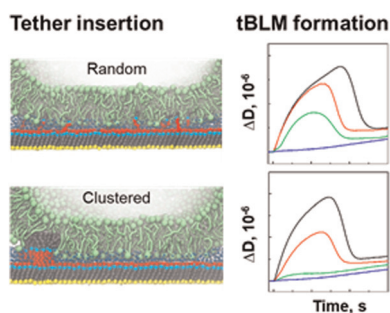
9752

Urea hydrolysis catalyzed by Urease

Single-layer HfNb_3O_8 with strong and nearby Lewis and Brønsted acid sites boosts amide bond hydrolysis for urease mimicking

Guohan Sun, Bo Yuan, Xinyu Wu, Shun Ying Lau, Linyuan Tian, Jung-Hoon Lee,* Keizo Nakagawa and Yung-Kang Peng*

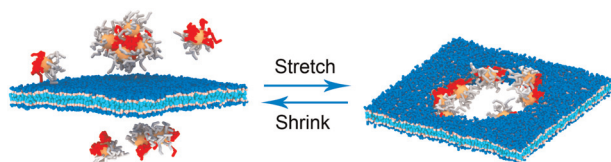
9759



Bilayer lipid membrane formation on surface assemblies with sparsely distributed tethers

Martynas Gavutis, Eric Schulze-Niemand, Hung-Hsun Lee, Bo Liedberg, Matthias Stein* and Ramūnas Valiokas*

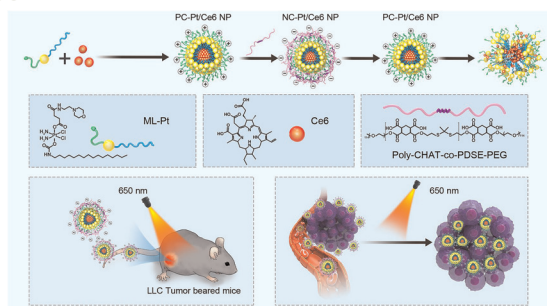
9775



Janus polymer-grafted nanoparticles mimicking membrane repair proteins for the prevention of lipid membrane rupture

Bin Li, Huimin Gao* and Zhong-Yuan Lu*

9783



Light-activated PEG deshielding core-shell nanoparticles for enhanced chemo-photodynamic combination therapy

Jinbo Zhang, Lingpu Zhang, Jianmei Guo, Bingzheng Yu, Yingjie Yu* and Chaoyong Liu*

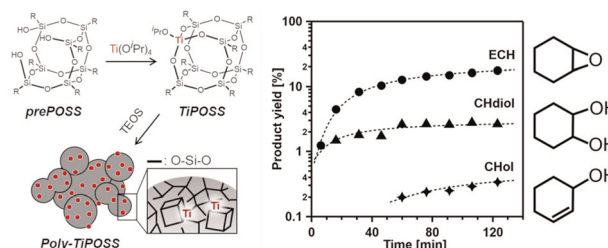


PAPERS

9792

Synthesis of titanasilicate nanoparticles with high titanium content from a silsesquioxane-based precursor for a model epoxidation reaction

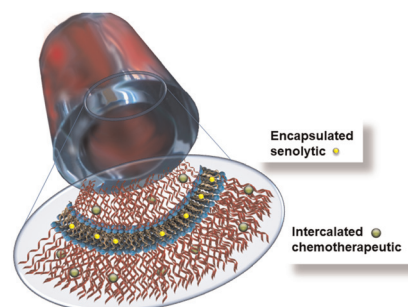
Takahiko Moteki,* Tomohiro Sei and Masaru Ogura



9801

Formation of ssDNA nanotubes from spherical micelles and their use as a delivery vehicle for chemotherapeutics and senolytics to triple negative breast cancer cells

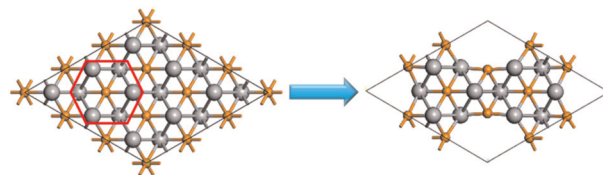
Lucy Lin, Zachary Schneiderman, Aditya Venkatraman and Efrosini Kokkoli*



9813

Rational design of periodic porous titanium nitride MXene as a multifunctional catalytic membrane

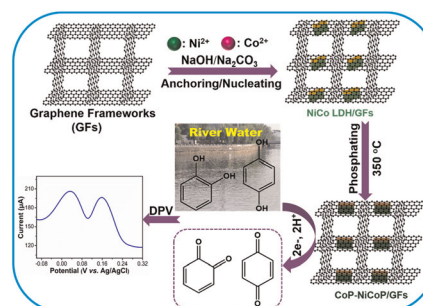
Tianqi Zhang, Zhaojian Zheng, Hao Lu, Hao Liu, Guobo Chen, Shuwei Xia, Long Zhou* and Meng Qiu*



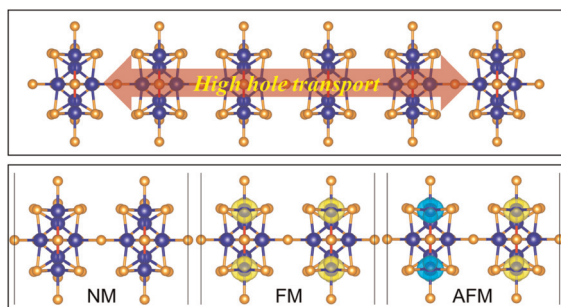
9823

Insights into the enhanced electrochemical sensing behavior of hydroquinone and catechol simultaneously enabled by ultrafine layer CoP–NiCoP heterostructure on graphene frameworks

Yanyan Zhu,* Kai Kang, Juan Jia, Sen Wang* and Jing Wang*



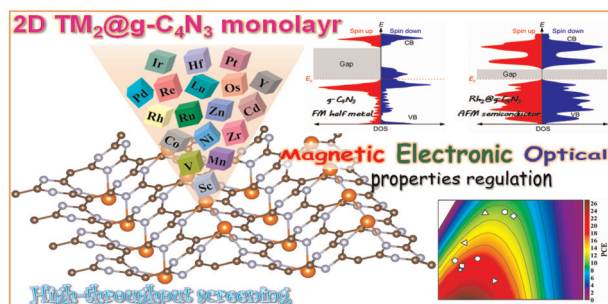
9835



Ferromagnetic and half-metallic phase transition by doping in a one-dimensional narrow-bandgap W_6PCL_{17} semiconductor

Yusen Qiao and Huabing Yin*

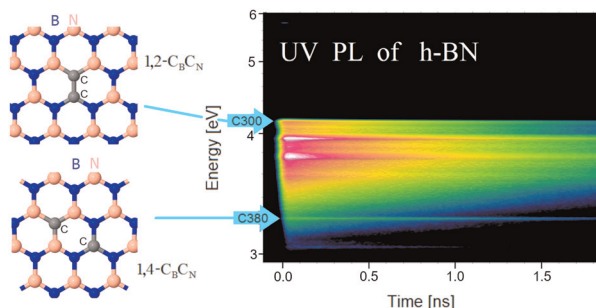
9843



Effective modulation of the exotic properties of two-dimensional multifunctional $TM_2@g-C_4N_3$ monolayers via transition metal permutation and biaxial strain

De-Bing Long, Yulin Feng, Guoying Gao and Li-Ming Yang*

9864



Growth temperature induced changes of luminescence in epitaxial BN: from colour centres to donor–acceptor recombination

K. P. Korona,* J. Binder, A. K. Dąbrowska, J. Iwański, A. Reszka, T. Korona, M. Tokarczyk, R. Stępniewski and A. Wysmótek

