

# Materials Advances

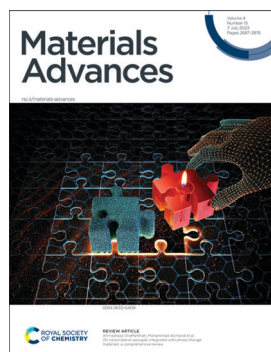
An open access journal publishing across the breadth of materials science

[rsc.li/materials-advances](https://rsc.li/materials-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 2633-5409 CODEN MAADC9 4(13) 2687–2876 (2023)



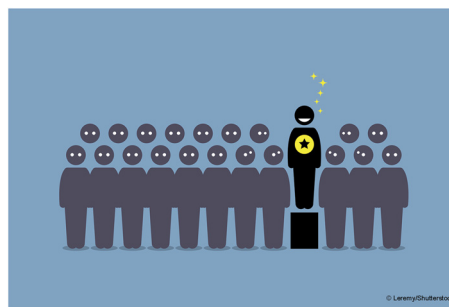
### Cover

See Ahmadreza Ghaffarkhah, Mohammad Arjmand *et al.*, pp. 2698–2729. Image reproduced by permission of Mohammad Arjmand from *Mater. Adv.*, 2023, 4, 2698.

## EDITORIALS

2694

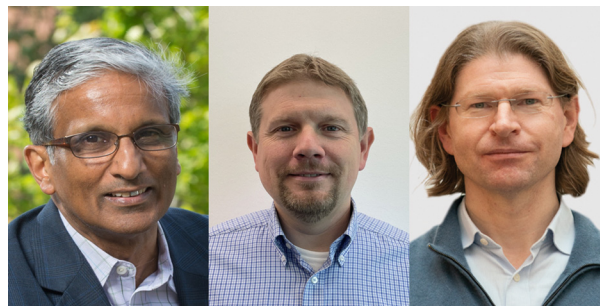
### Outstanding Reviewers for *Materials Advances* in 2022



2695

### Introduction to Materials Informatics

Krishna Rajan, Jörg Behler and Chris J. Pickard\*



## Editorial Staff

### Executive Editor

Jeremy Allen

### Deputy Editor

Hannah Kerr

### Editorial Production Manager

Christopher Goodall

### Assistant Editors

Zita Zachariah and Serra Arslançan Sengelen

### Editorial Assistant

Rosie Hague

### Publishing Assistant

Allison Holloway

### Publisher

Neil Hammond

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

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

E-mail: [materialsadvances-rsc@rsc.org](mailto:materialsadvances-rsc@rsc.org)

Materials Advances (electronic: ISSN 2633-5409) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

Materials 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 0WF, 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)

# Materials Advances

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

*Materials Advances* publishes experimental and theoretical work across the breadth of materials science.

## Editorial Board

### Editors-in-Chief

Anders Hagfeldt, EPFL, Switzerland  
Jeroen Cornelissen, University of Twente, The Netherlands  
Natalie Stingelin, Georgia Institute of Technology, USA

### Associate Editors

A. S. Achalkumar, Indian Institute of Technology, India  
Veronica Augustyn, North Carolina State University, USA  
Viola Birss, University of Calgary, Canada  
Kaushik Chatterjee, Indian Institute of Science, India  
Elizabeth Cosgriff-Hernandez, University of Texas at Austin, USA  
Rachel Crespo-Otero, Queen Mary University of London, UK  
Gemma-Louise Davies, University College London, UK  
Goutam De, S N Bose National Centre for Basic Sciences, India  
Renaud Demadrille, Interdisciplinary Research Institute of Grenoble, France  
Håkan Engqvist, Uppsala University, Sweden  
Antonio Facchetti, Northwestern University and Flexterra Corporation, USA

Ghim Wei Ho, National University of Singapore, Singapore  
Yun Jeong Hwang, Korea Institute of Science and Technology, South Korea  
Unyong Jeong, POSTECH, South Korea  
Ji Jian, Zhejiang University, China  
Oana Jurchescu, Wake Forest University, USA  
Kisuk Kang, Seoul National University, South Korea  
Subrata Kundu, Central Electrochemical Research Institute (CECRI), India  
Dan Li, Jinan University, China  
Mingzhu Li, Chinese Academy of Sciences, China  
Shaoqin Liu, Harbin Institute of Technology, China  
David Lou, Nanyang Technological University, Singapore  
Yi-Chun Lu, The Chinese University of Hong Kong, Hong Kong  
Martyn McLachlan, Imperial College London, UK  
Yoshiko Miura, Kyushu University, Japan  
Kasper Moth-Poulsen, Chalmers University of Technology, Sweden  
Ana Flavia Nogueira, University of Campinas, Brazil

Shizhang Qiao, University of Adelaide, Australia  
Erin Ratcliff, University of Arizona, USA  
Neil Robertson, University of Edinburgh, UK  
Federico Rosei, University of Trieste, Italy  
Jennifer Rupp, Massachusetts Institute of Technology, USA  
Miriam Unterlass, Vienna University of Technology, Austria  
Yana Vaynzof, Technical University of Dresden, Germany  
Jessica Winter, Ohio State University, USA  
Lydia Wong, Nanyang Technological University, Singapore  
Li-Zhu Wu, Technical Institute of Physics and Chemistry, China  
Zhiguo Xia, South China University of Technology, China  
Yusuke Yamauchi, University of Queensland, Australia  
Chengzhong Yu, University of Queensland, Australia  
Haoli Zhang, Lanzhou University, China  
Ni Zhao, Chinese University of Hong Kong, Hong Kong  
Zhen Zhou, Nankai University, China

## Advisory Board

Please see the Materials Advances journal webpage for full details of our advisory board: [rsc.li/materials-advances](http://rsc.li/materials-advances)

## Information for Authors

Full details on how to submit material for publication in Materials 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/materials-advances](http://rsc.li/materials-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.

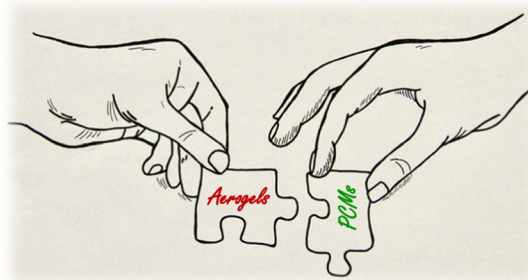
Registered charity number: 207890



2698

# 2D nanomaterial aerogels integrated with phase change materials: a comprehensive review

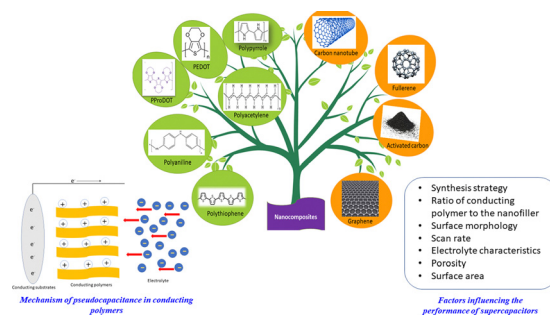
Sara Rostami, Ahmadreza Ghaffarkhah,\* Ali Akbar Isari,  
Seyyed Alireza Hashemi and Mohammad Arjmand\*



2730

## A review on fine-tuning of energy storage characteristics of conducting polymers

Bindu M.\* and Pradeepan Periyat\*

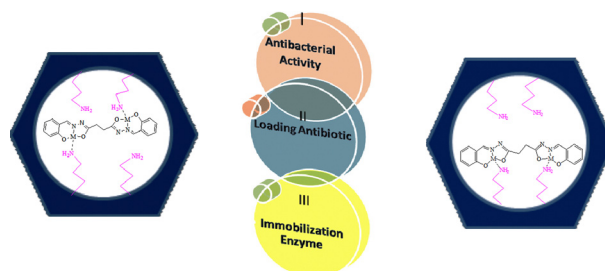


## HIGHLIGHT

2770

# Synthesis of novel mesoporous silica nanoparticles functionalized with succinic dihydrazone Schiff-base metal complexes and a study of their biological activities

Leila Tahmasbi,\* Tahereh Sedaghat, Hossein Motamedi  
and Mohammad kooti

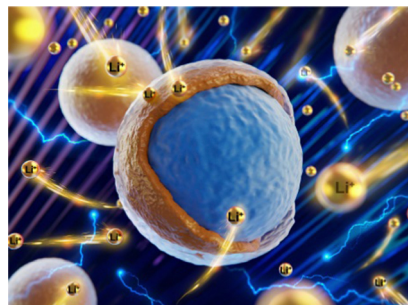


## COMMUNICATION

2780

# Realizing fast Li-ion conduction of $\text{Li}_3\text{PO}_4$ solid electrolyte at low temperature by mechanochemical formation of lithium-containing dual-shells

Shunqin Zeng, Xiaoli Ding,\* Liqing He,  
Hai-Wen Li,\* Qingan Zhang and Yongtao Li



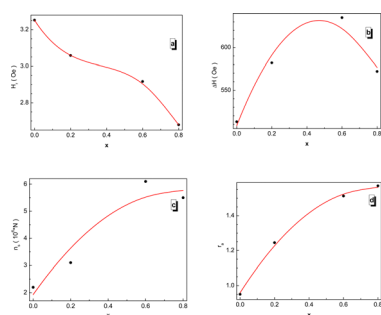
2785



### Chemical recycling of poly(ethylene terephthalate) via sequential glycolysis, oleoyl chloride esterification and vulcanization to yield durable composites

Claudia V. Lopez and Rhett C. Smith\*

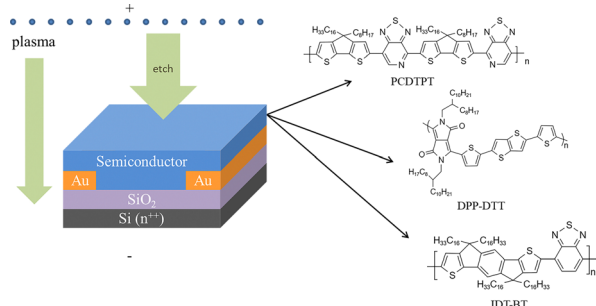
2794



### Fabrication of doped ferrites and exploration of their structure and magnetic behavior

Reda E. El-Shater, Hassan El Shimy, Samia A. Saafan, Moustafa A. Darwish, Di Zhou, Kadiyala Chandra Babu Naidu, Mayeen U. Khandaker, Z. Mahmoud, Alex V. Trukhanov, Sergei V. Trukhanov\* and Fatma Fakhry

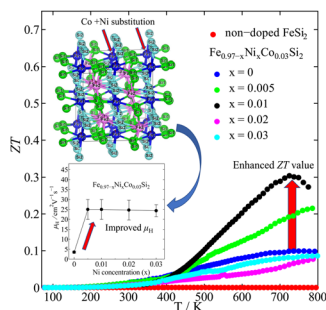
2811



### In situ tuning of the performance of polymer field-effect transistors by soft plasma etching

Zhen Hu, Dongfan Li,\* Wanlong Lu, Zongze Qin, Yixin Ran, Xin Wang and Guanghao Lu\*

2821



### Improved thermoelectric performance of Co-doped β-FeSi<sub>2</sub> by Ni substitution

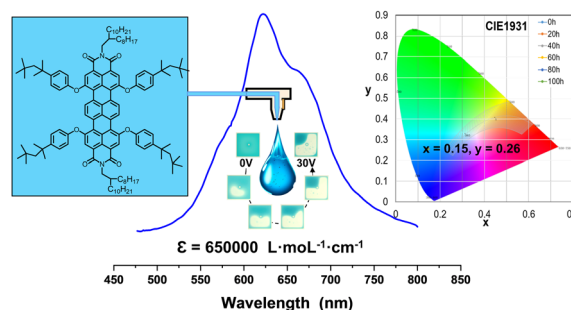
Sopheap Sam, Hiroshi Nakatsugawa\* and Yoichi Okamoto



2831

## Design and synthesis of a terylene diimide-based stable cyan dye for printable electrofluidic display

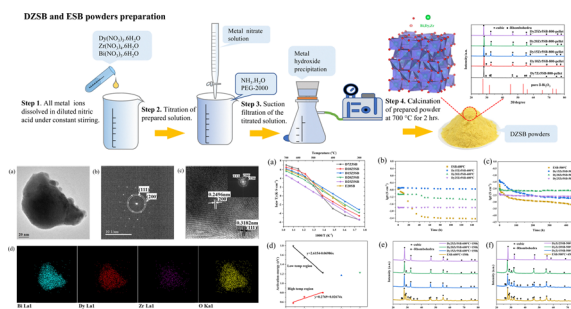
Yong Deng, Yuanyuan Guo, Dechao Ye, Wangqiao Chen\* and Guofu Zhou\*



2839

## Stabilities and performance of single cubic phase dysprosium and zirconium co-doped bismuth oxide electrolytes for low temperature solid oxide fuel cells

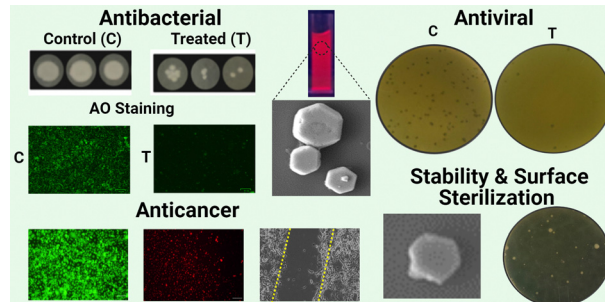
Yuan Gao, Mengxi Zhong, Jianpeng Chen, Shouqi Wang, Binyi Zhang, Qingzhuo Li, Wei Liu, Jiu-Tao Gao,\* Cheng-Xin Li\* and Chang-Jiu Li



2853

## Copper iodide microhexagons: a potential therapeutic agent for surface microbial infection and melanoma

Sunil Venkanna Pogu, Dokkari Nagalaxmi Yadav, Sri Amruthaa Sankaranarayanan, Rupali Srivastava, Shashidhar Thatikonda and Aravind Kumar Rengan\*



2868

## Macroporous NiMo alloy self-supporting electrodes for efficient hydrogen evolution at ultrahigh current densities

Yudan Chen, Lin Chen, Ying Xiong, Xinxin Yu, Kun Tang,\* Lixin Zhang and Mingzai Wu\*

