

# 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(15) 3075–3370 (2023)



### Cover

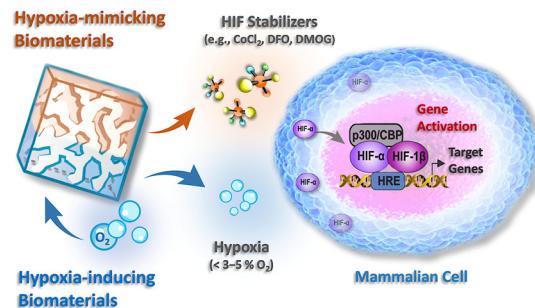
See Sidi A. Bencherif et al., pp. 3084–3090.  
Image reproduced by permission of Sidi A. Bencherif from *Mater. Adv.*, 2023, 4, 3084.

## PERSPECTIVE

3084

### HIF-stabilizing biomaterials: from hypoxia-mimicking to hypoxia-inducing

Thibault Colombani, Khushbu Bhatt, Boris Epel, Mignayani Kotecha and Sidi A. Bencherif\*

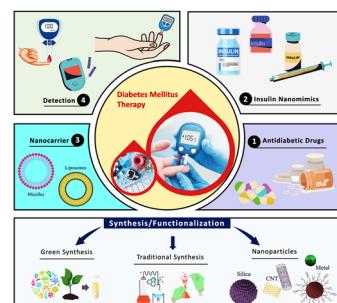


## REVIEWS

3091

### Emerging trends in nano-based antidiabetic therapeutics: a path to effective diabetes management

Ritika Sharma, Shikha Jyoti Borah, Bhawna, Sanjeev Kumar, Akanksha Gupta, Vandana Kumari, Ravinder Kumar,\* Kashyap Kumar Dubey and Vinod Kumar\*



**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 Demadral, 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

Shaojin 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

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/repubish 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

3114

**Advances in electrospun chitosan nanofiber biomaterials for biomedical applications**

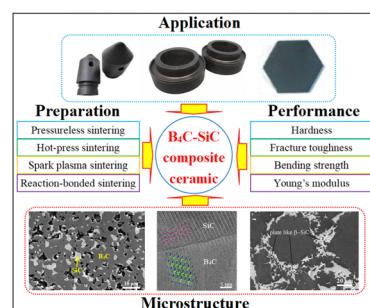
Ganesan Padmini Tamilarasi, Govindaraj Sabarees, Krishnan Manikandan,\* Siddan Gouthaman, Veerachamy Alagarsamy\* and Viswas Raja Solomon\*



3140

**Recent progress in  $B_4C$ –SiC composite ceramics: processing, microstructure, and mechanical properties**

Wei Zhang

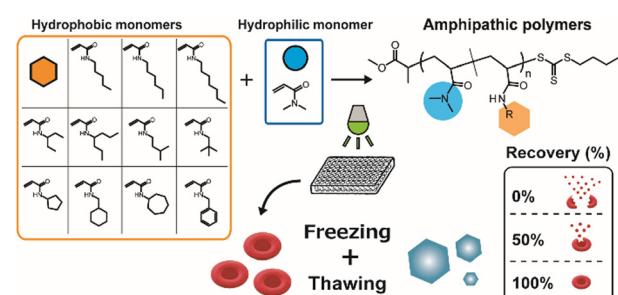


## COMMUNICATION

3192

**Preparation of an amphiphatic polymer library in a mixture of water/ethanol by photoinduced polymerization and evaluation of the cryoprotective activity**

Masanori Nagao,\* Shuya Tanaka and Yoshiko Miura\*

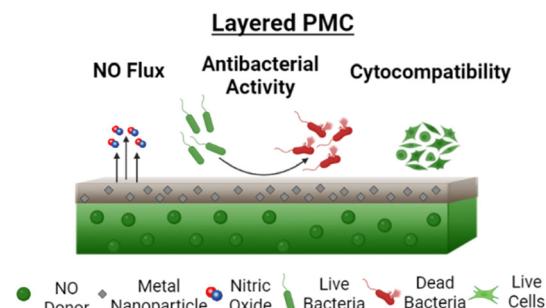


## PAPERS

3197

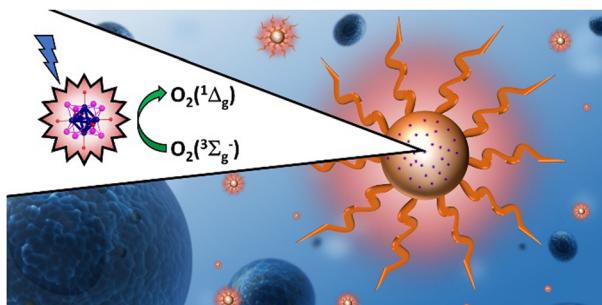
**Catalytic effect of transition metal-doped medical grade polymer on *S*-nitrosothiol decomposition and its biological response**

Arnab Mondal, Patrick Maffe, Sarah N. Wilson, Sama Ghalei, Ricky Palacio, Hitesh Handa and Elizabeth J. Brisbois\*



## PAPERS

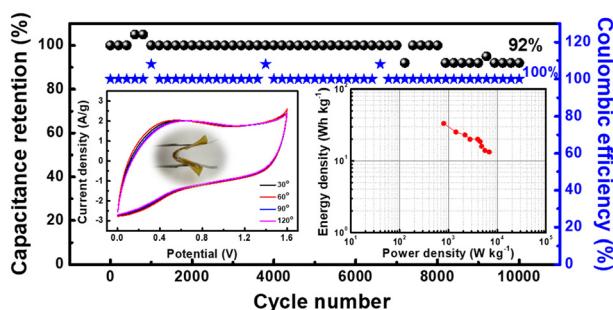
3207



**PEGylated poly(lactic-co-glycolic acid) nanoparticles doped with molybdenum-iodide nanoclusters as a promising photodynamic therapy agent against ovarian cancer**

Alexis Verger,\* Gilles Dollo, Nolwenn Brandhonneur, Sophie Martinais, Stéphane Cordier, Kamil Lang, Maria Amela-Cortes and Kaplan Kirakci\*

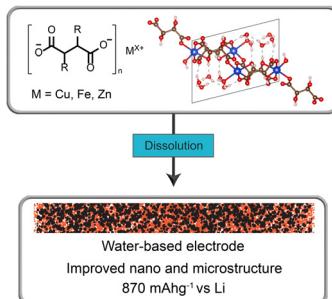
3215



**Polyacrylonitrile-grafted lignin copolymer derived carbon nanofibers as a flexible electrode for high-performance capacitive-energy storage**

Da-Young Kim, Sivaprakasam Radhakrishnan, Seungmin Yu and Byoung-Suhk Kim\*

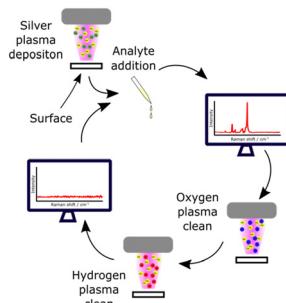
3224



**Metal dicarboxylates as anode materials for Li-ion batteries**

Matthew Teusner,\* Jitendra Mata, Bernt Johannessen, Glen Stewart, Seán Cadogan and Neeraj Sharma

3239



**Rapid single step atmospheric pressure plasma jet deposition of a SERS active surface**

Oliver S. J. Hagger, M. Emre Sener, Imran Khan, Francis Lockwood Estrin, Stefanos Agrotis, Albertus D. Handoko, Ivan P. Parkin and Daren J. Caruana\*

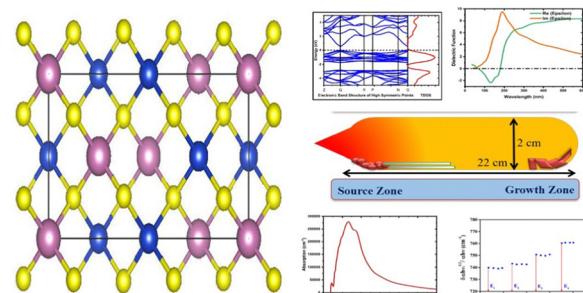


## PAPERS

3246

## First principle insights and experimental investigations of the electronic and optical properties of $\text{CuInS}_2$ single crystals

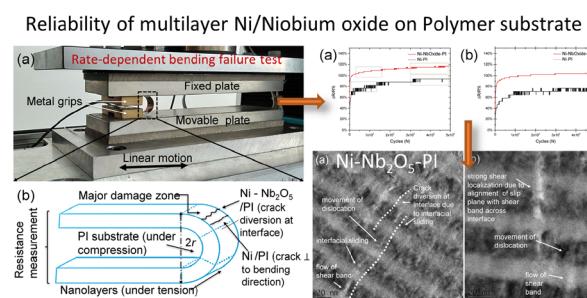
Ranjan Kr. Giri,\* Sunil H. Chaki,\* Mehul S. Dave, Shivani R. Bharucha, Ankurkumar J. Khimani, Rohitkumar M. Kannaujiya, Milind P. Deshpande and Mitesh B. Solanki



3257

## Investigation of the reliability of nano-nickel/niobium oxide-based multilayer thin films deposited on polymer substrates for flexible electronic applications

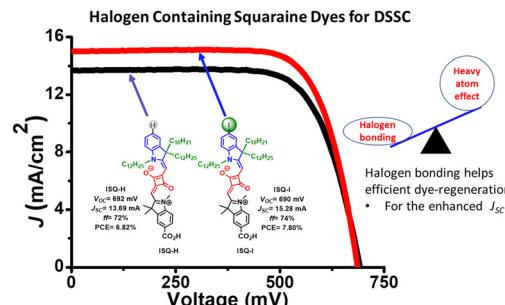
Rahul Sahay,\* Yen-Cheng Tu, Izzat Aziz, Arief S. Budiman,\* Cher Ming Tan, Pooi See Lee, Olivier Thomas and Nagarajan Raghavan\*



3270

## Halogen functionalized D-A-D-type unsymmetrical squaraine dyes for dye-sensitized solar cells

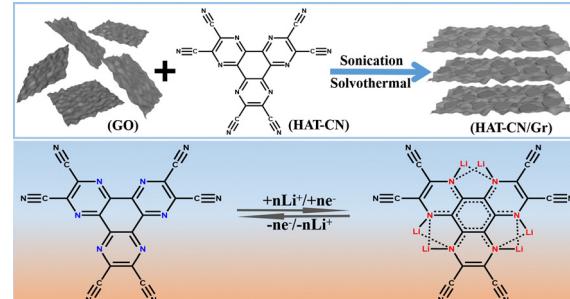
Indrajeet S. Nawghare, Ambarish Kumar Singh, Ashakiran Maibam, Shivdeep Suresh Deshmukh, Sailaja Krishnamurty,\* Kothandam Krishnamoorthy\* and Jayaraj Nithyanandhan\*



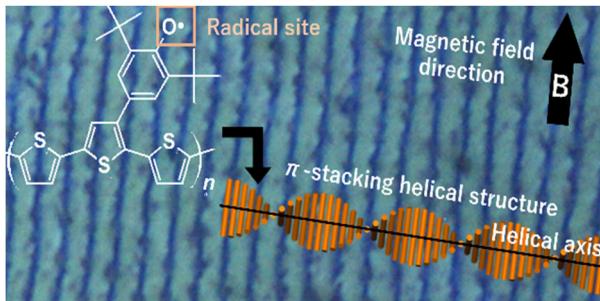
3285

## Graphene-sandwiched nitrogen-enriched $\pi$ -conjugated molecules as redox-active cathodes for Li-ion batteries

Kai Chen, Xiaolan Ma, Xiaoyan Han\* and Yingkui Yang\*



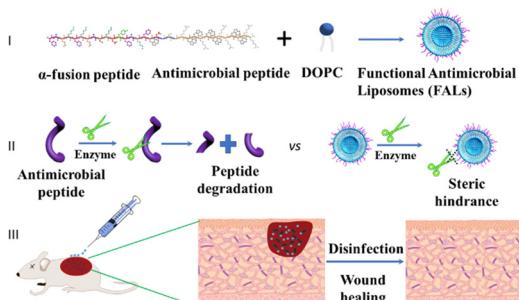
3292



## Oriented quasi-domain structure of helical spin polymers prepared by electrochemical polymerization in a cholesteric liquid crystal under a magnetic field, showing a helical stripe magnetic domain

Masashi Otaki, Shigeki Nimori and Hiromasa Goto\*

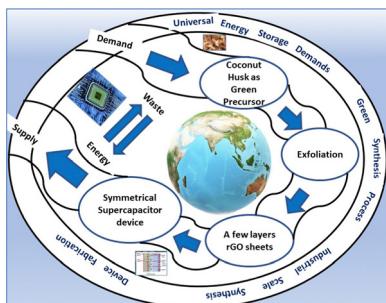
3303



## Nanoliposomes protecting antimicrobial peptides via membrane-fused incorporation to fight wound infection

Hao Xue, Jiaying Li, Liwei Zhang, Xiaolu Song,\* Hui Shi, Yonghai Feng, Shuai Hou, Zengkai Wang, Taofeng Zhu\* and Lei Liu\*

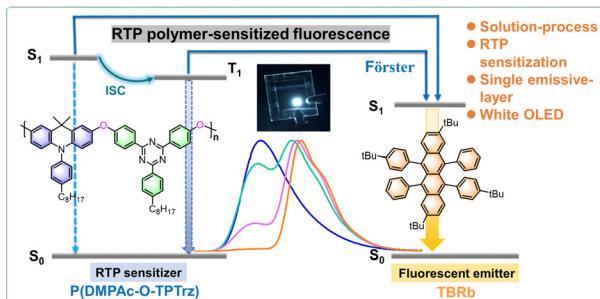
3310



# Coconut-husk derived graphene for supercapacitor applications: comparative analysis of polymer gel and aqueous electrolytes

Gaurav Tatrari, Chetna Tewari, Mayank Pathak, Diksha Bhatt, Manisha Solanki, Faiz Ullah Shah and Nanda Gopal Sahoo\*

3323



## Solution-processed orange and white OLEDs sensitized by an electroactive pure organic room-temperature phosphorescent polymer

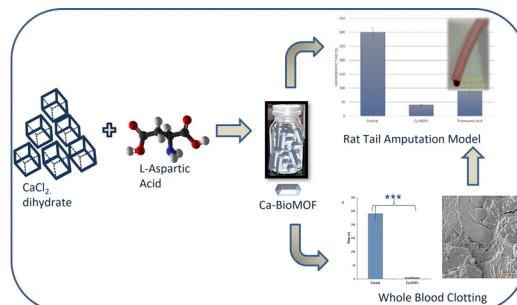
Yiting Tian, Renze He, Guoyun Meng,\* Shumeng Wang,\*  
Lei Zhao and Jungqiao Ding\*

## PAPERS

3330

## Development of novel aspartic acid-based calcium bio-MOF designed for the management of severe bleeding

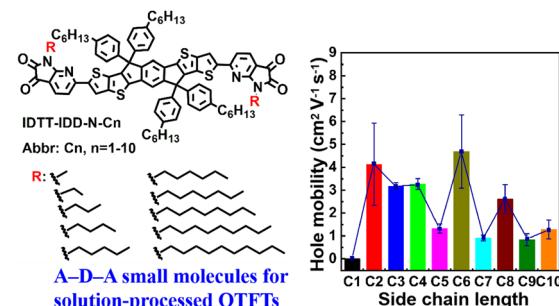
Chandan Bhogendra Jha, Chitrangda Singh, Raunak Varshney, Sweta Singh, Kuntal Manna\* and Rashi Mathur\*



3344

## Optimized charge transport in *N*-substituted isatin-based acceptor–donor–acceptor small molecules by regulating the side chain length for solution-processable organic thin-film transistors

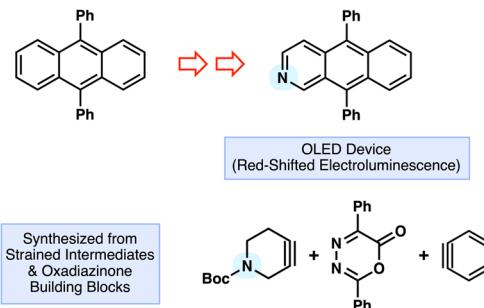
Wenyu Cai, Jiyun Lee, Yao Zhao, Boseok Kang\* and Guobing Zhang\*



3351

## Facile synthesis of 2-aza-9,10-diphenylanthracene and the effect of precise nitrogen atom incorporation on OLED emitters performance

Evan R. Darzi, Dane A. Stanfield, Luca McDermott, Andrew V. Kelleghan, Benjamin J. Schwartz\* and Neil K. Garg\*



3356

## Preparation of citric acid/porous starch composite adsorbents and their adsorption studies

Yangyang Zheng, Ye He, Chang Liu, Leqian Song and Huacheng Zhang\*

