

Materials Advances

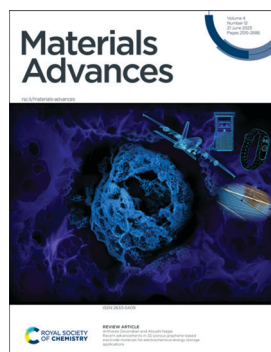
An open access journal publishing across the breadth of materials science

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.

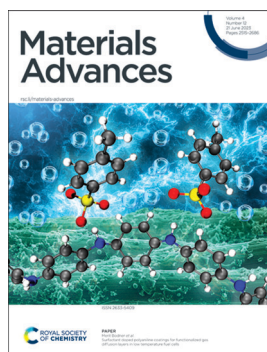
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(12) 2515-2686 (2023)



Cover

See Arthisree Devendran and Atsushi Nagai, pp. 2524–2543. Image reproduced by permission of Arthisree Devendran and Atsushi Nagai from ENSEMBLE3 from *Mater. Adv.*, 2023, 4, 2524.



Inside cover

See Merit Bodner *et al.*, pp. 2573–2585. Image reproduced by permission of Mario Maglie and Florian Tritscher from *Mater. Adv.*, 2023, 4, 2573.

EDITORIAL

2522

Introduction to “Shaping the future using thin films and nanotechnology”

Aruna Ivaturi* and Oomman Varghese*

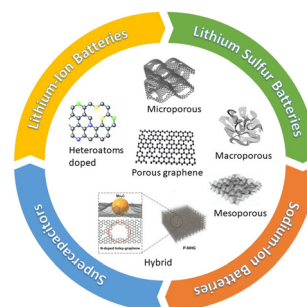


REVIEWS

2524

Recent advancements in 3D porous graphene-based electrode materials for electrochemical energy storage applications

Arthisree Devendran and Atsushi Nagai*



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

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

E-mail: 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 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

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

Materials Advances

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

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

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

2544

Nanotechnology based therapeutic approaches: an advanced strategy to target the biofilm of ESKAPE pathogens

Arpita Mukherjee, Somashree Bose, Anirban Shao and Sujoy K. Das*



PAPERS

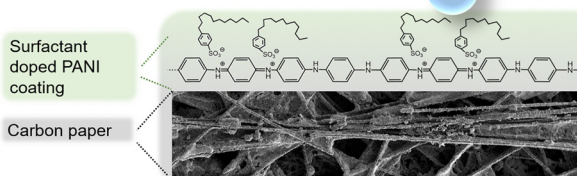
2573

Surfactant doped polyaniline coatings for functionalized gas diffusion layers in low temperature fuel cells

Florian Tritscher, Adrian Mularczyk, Antoni Forner-Cuenca, Viktor Hacker and Merit Bodner*

Functional coatings for gas diffusion layers in fuel cells:

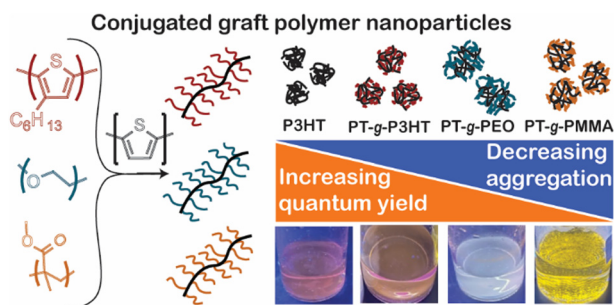
- PTFE-free
- Improved electrical conductivity
- Controllable hydrophobicity



2586

Enhancing photoluminescence of conjugated nanoparticles through graft polymer architectures

Ashley E. Masucci, Masoud Ghasemi, Christian W. Pester* and Enrique D. Gomez*



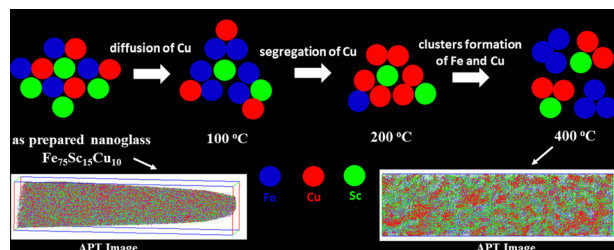
2595

Ni(II) and Zn(II)-metallogel-based anti-bacterial scaffolds for fabricating light-responsive junction-type semiconducting diodes with non-ohmic conduction mechanism

Gerald Lepcha, Baishakhi Pal, Santanu Majumdar, Kazi Tawsif Ahmed, Indrajit Pal, Swadesh Ranjan Biswas, Partha Pratim Ray* and Biswajit Dey*



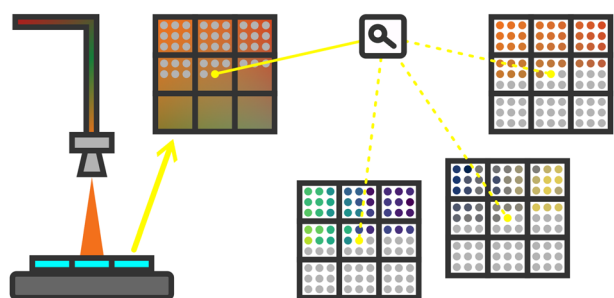
2604



Nano-alloying and nano-chemistry of the immiscible elements Fe and Cu in a FeSc–Cu nanoglass

Shiv Prakash Singh,* Mohammed Reda Chellali, Torben Boll, Herbert Gleiter and Horst Hahn

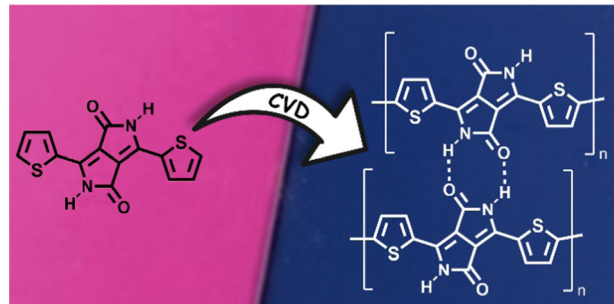
2612



Accelerated screening of Cu–Ga–Fe oxide semiconductors by combinatorial spray deposition and high-throughput analysis

Maximilian Wolf,* Georg K. H. Madsen and Theodoros Dimopoulos*

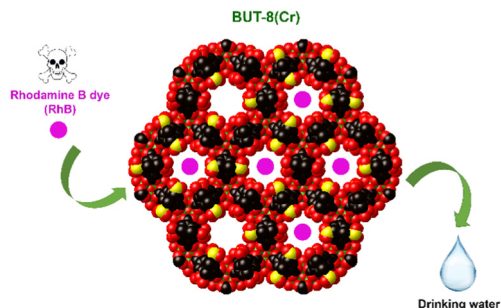
2625



Unsubstituted thiophene–diketopyrrolopyrrole conjugated polymer thin films via oxidative chemical vapor deposition – electronic behavior

Marek K. Charyton, Tobias Reiker, Kamil Kotwica, Monika Góra, Helmut Zacharias and Nicolas D. Boscher*

2636



Efficiently improving the adsorption capacity of the Rhodamine B dye in a SO₃H-functionalized chromium-based metal–organic framework

Khang M. V. Nguyen, Anh V. N. Phan, Nhung T. Dang, Truong Q. Tran, Huy K. Duong, Hung N. Nguyen and My V. Nguyen*

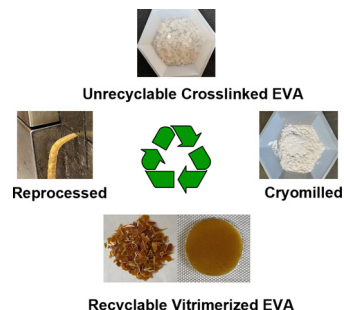


PAPERS

2648

Vitrimerization of crosslinked elastomers: a mechanochemical approach for recycling thermoset polymers

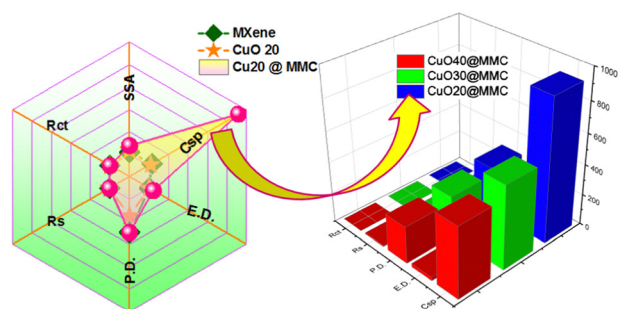
Alireza Bandegi, Thomas G. Gray,* Sarah Mitchell, Amin Jamei Oskouei, Michelle K. Sing, Jayme Kennedy, Kimberly Miller McLoughlin and Ica Manas-Zloczower*



2659

Facile synthesis of ternary MXene nanocomposites as an electrode for supercapacitive applications

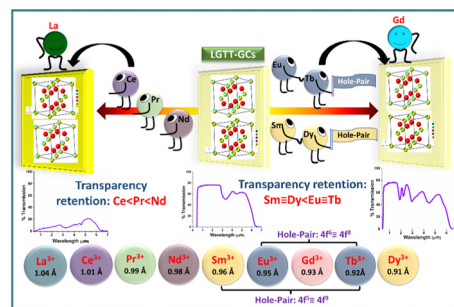
Rutuja A. Chavan, Desta M. Ulliso, Akash S. Rasal, Jia Yaw Chang and Anil Vithal Ghule*



2667

The effect of rare earth (RE³⁺) ionic radii on transparent lanthanide-tellurite glass-ceramics: correlation between 'hole-formalism' and crystallization

Pritha Patra, K. Jayanthi, Fabian Margit, Shweta R. Keshri, Sandip Bysakh, Kaushik Biswas, Nitya Nand Gosvami, N. M. Anoop Krishnan, Amarnath R. Allu and K. Annapurna*



CORRECTION

2683

Correction: Cellulose-assisted electrodeposition of zinc for morphological control in battery metal recycling

B. W. Hoogendoorn, M. Parra, A. J. Capezza, Y. Li, K. Forsberg, X. Xiao* and R. T. Olsson*

