

Materials Advances

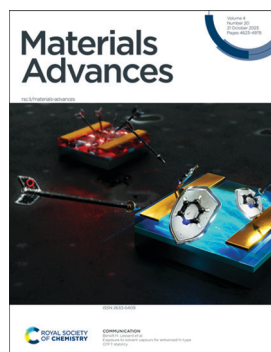
An open access journal publishing across the breadth of materials science

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.

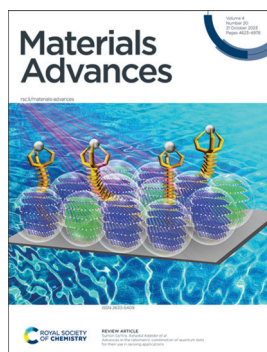
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(20) 4623-4978 (2023)



Cover

See Benoît H. Lessard *et al.*, pp. 4707–4711. Image reproduced by permission of Benoît H. Lessard from *Mater. Adv.*, 2023, 4, 4707.



Inside cover

See Sumon Santra, Ashadul Adalder *et al.*, pp. 4646–4664. Image reproduced by permission of Ashadul Adalder from *Mater. Adv.*, 2023, 4, 4646.

EDITORIAL

4635

Announcing the Materials Advances Paper Prize

Hannah E. Kerr,* Jeremy P. Allen, Anders Hagfeldt, Jeroen J. L. M. Cornelissen and Natalie Stingelin

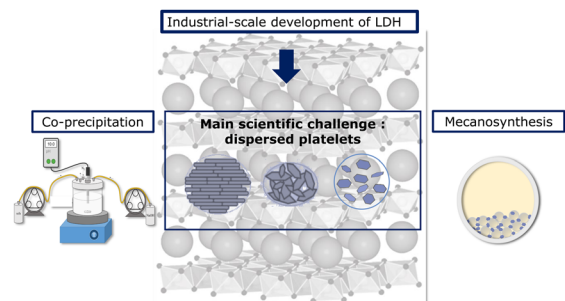


PERSPECTIVE

4637

Layered double hydroxides: where should research stress on for massive scaling up?

Claire Dazon,* Christine Taviot-Guého and Vanessa Prévot



Editorial Staff

Executive Editor

Jeremy Allen

Deputy Editor

Hannah Kerr

Editorial Production Manager

Daniella Ferluccio

Assistant Editors

Zita Zachariah, Serra Arslançan Sengelen and Zifei Lu

Editorial Assistant

Rosie Hague

Publishing Assistant

Allison Holloway

Publisher

Neil Hammond

For queries about submitted papers, please contact Daniella Ferluccio, 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, Technical Institute of Physics and Chemistry, 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
Erin Ratcliff, University of Arizona, USA
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
Maia Vergniory, Max Planck Institute for Chemical Physics of Solids, 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

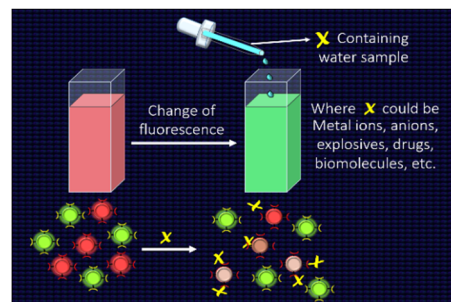


REVIEWS

4646

Advances in the ratiometric combination of quantum dots for their use in sensing applications

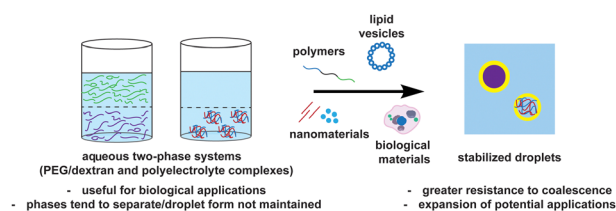
Sumon Santra,* Sourav Dutta and Ashadul Adalder*



4665

Interfacial stabilization of aqueous two-phase systems: a review

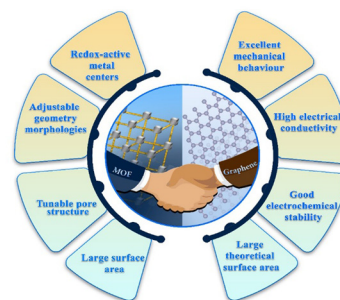
Caitlyn Fick, Zara Khan and Samanvaya Srivastava*



4679

Metal–organic framework and graphene composites: advanced materials for electrochemical supercapacitor applications

Debal Kanti Singha, Rupali Ipsita Mohanty, Piyali Bhanja and Bikash Kumar Jena*

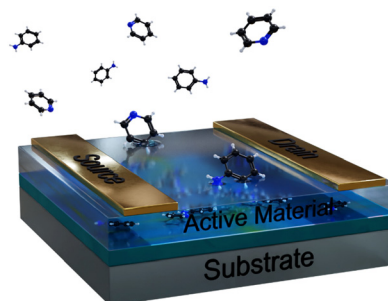


COMMUNICATIONS

4707

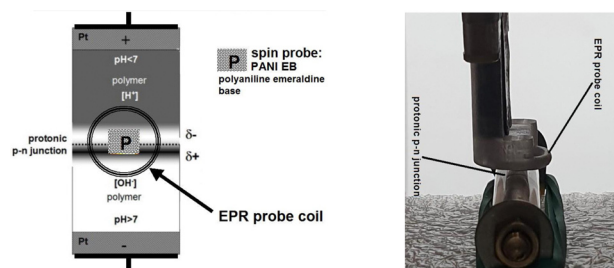
Exposure to solvent vapours for enhanced N-type OTFT stability

Samantha Brixi, Halynne R. Lamontagne, Benjamin King, Adam J. Shuhendler and Benoît H. Lessard*



COMMUNICATIONS

4712

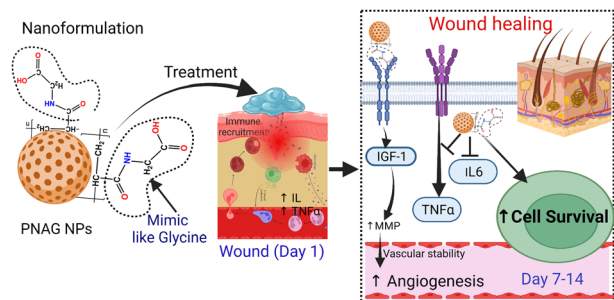


Proton density monitoring at the interface of proton-donor and proton-acceptor regions in a protonic p–n junction with bias voltage

Jerzy J. Langer,* Mikołaj Baranowski, Maciej Kujawa and Sebastian Golczak

PAPERS

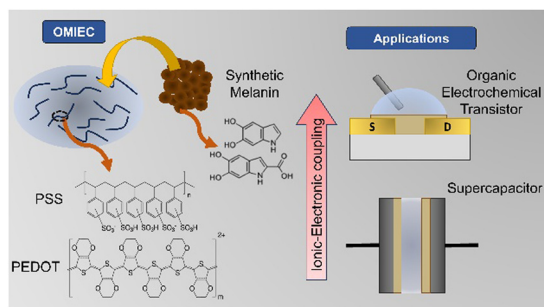
4718



In vivo potential of polymeric *N*-acryloyl-glycine nanoparticles with anti-inflammatory activities for wound healing

Prem Shankar Gupta, Kirti Wasnik, Gurmeet Singh, Sukanya Patra, Divya Pareek, Desh Deepak Yadav, Munendra Singh Tomar, Samedutta Maiti, Monika Singh and Pradip Paik*

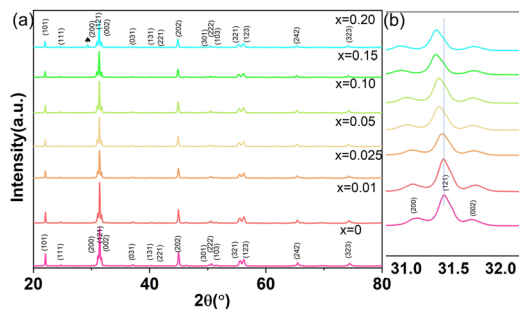
4732



Melanin/PEDOT:PSS blend as organic mixed ionic electronic conductor (OMIEC) for sustainable electronics

Natan Luis Nozella, João Victor Morais Lima, Rafael Furlan de Oliveira* and Carlos Frederico de Oliveira Graeff*

4744



The effects of double-site yttria-doping on the structures and dielectric properties of $(\text{Ca,Sr})_z(\text{Zr,Ti})\text{O}_{3-\delta}$ perovskite ceramics

Ying Chen, Qingyang Pang, Genshui Wang, Zhaoquan Zhang, Chenxi Zhu, Xin Li, Liangcai Wu* and Zhitang Song*

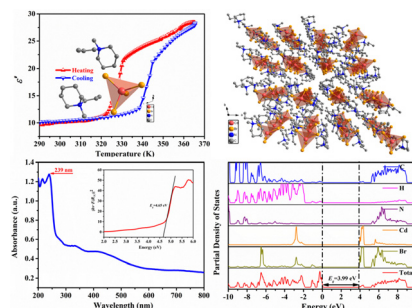


PAPERS

4755

Organic–inorganic hybrid multifunctional materials with high- T_c reversible phase transition and wide bandgap properties

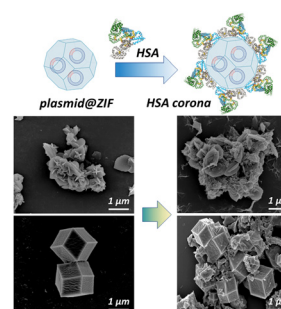
Yu-Xin Tan, Ting-Ting Ying,* Xiao-Wei Fan, Yan-Le Huang, Ming-Yang Wan, Qiao-Lin Li, Fang-Xin Wang and Meng-Na Wang



4761

Impact of nucleic acid encapsulated MOF crystal phase on protein corona formation

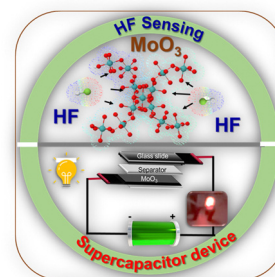
Shakil Ahmed Polash, Suneela Pyreddy, Amanda N Abraham, Sanje Mahasivam, Vipul Bansal, Linda Varadi, Gary Bryant and Ravi Shukla*



4775

Fluorane sensitive supercapacitive microcrystalline MoO₃: dual application in energy storage and HF detection

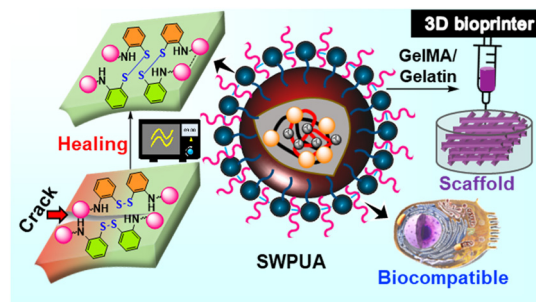
Love Bansal, Tanushree Ghosh, Suchita Kandpal, Chanchal Rani, Bhumika Sahu, Deb Kumar Rath, Christoph Wesemann, Sandeep Chhoker, Nadjia C. Bigall* and Rajesh Kumar*



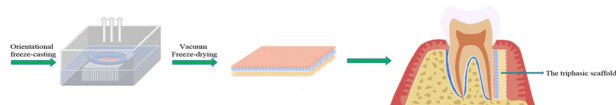
4784

A dynamic hard domain-induced self-healable waterborne poly(urethane/acrylic) hybrid dispersion for 3D printable biomedical scaffolds

Samiran Morang, Jay Hind Rajput, Anwesha Mukherjee, Atharva Poundarik, Bodhisatwa Das and Niranjana Karak*



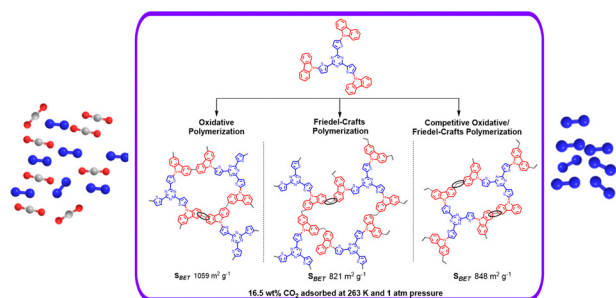
4798



Growth factor-encapsulated triphasic scaffolds of electrospun polylactic acid–polycaprolactone (PLA–PCL) nanofibrous mats combined with a directionally freeze-dried chitosan hydrogel for periodontal tissue regeneration

Wei-han Hua, Jie Xiang, Yeke Wu, Wei Yang* and Lixing Zhao*

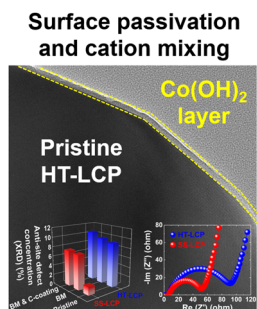
4812



Thienyltriazine-based porous organic polymers with nitrogen rich moieties: synthesis and gas selectivity study

Neha Rani Kumar,* Prasenjit Das, Abhijeet R. Agrawal, Sanjay Kumar Mandal* and Sanjio S. Zade*

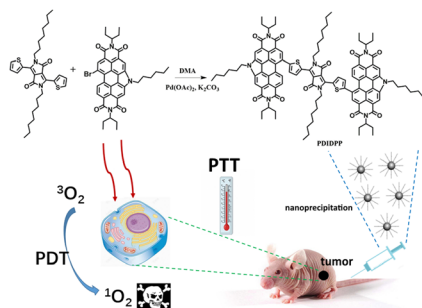
4823



Surface and bulk defect formation during hydrothermal synthesis of LiCoPO₄ crystals and their electrochemical implications

Moohyun Woo, Jinhyuk Lee and George P. Demopoulos*

4835



Synthesis of a new photosensitizer for photodynamic and photothermal synergistic cancer therapy

Jun Deng,* Xiaohua Xia, Hua Yuan, Zhiqiang Chen, Xin Jiang, Dengfeng Zou* and Qiang Wang*

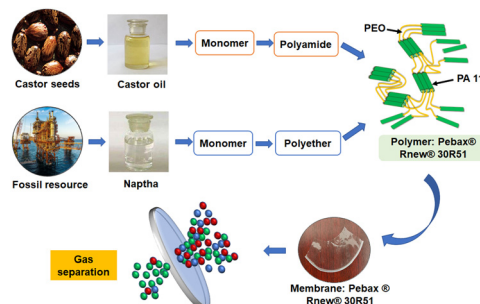


PAPERS

4843

Synthesis and characterization of a high-performance bio-based Pebax membrane for gas separation applications

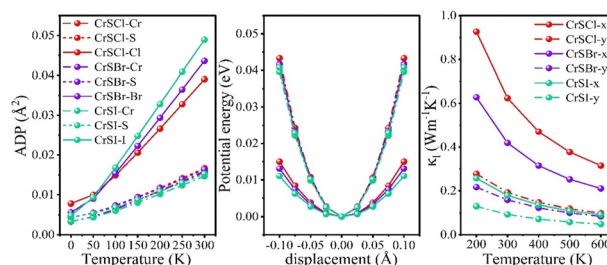
R. Surya Murali,* Amit Jha, Aarti, Swapnil Divekar and Soumen Dasgupta



4852

Ultralow thermal conductivity and anharmonic rattling in two-dimensional CrSX (X = Cl, Br, I) monolayers

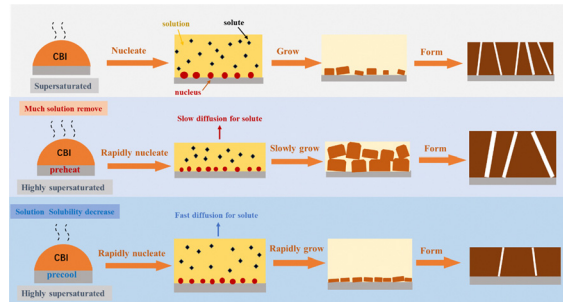
Xiaowei Xuan, Zhaoyu Yang, Rui Du, Yimeng Zhao, Yuli Yan, Chang Liu, Hang Li and Guangbiao Zhang*



4860

Cold- and hot-casting to regulate the morphology and charge carrier dynamics of CsBi₃I₁₀ towards efficient and stable thin-film solar cells

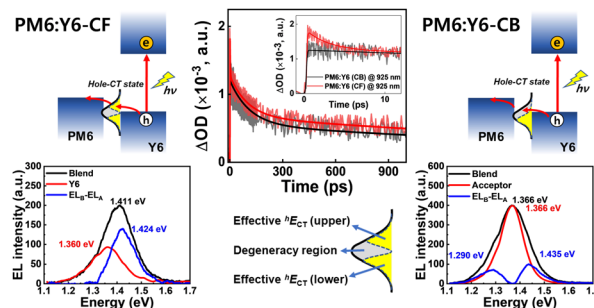
Xuejiao Wu, Peiyao Dong, Li Yang* and Jinbao Zhang*



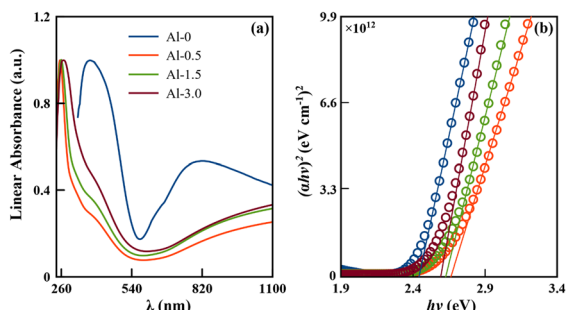
4869

Impact of solvent-induced morphological changes on the hole transfer dynamics during a charge separation process

Dongchan Lee, Chang-Mok Oh, Jiho Ryu, Sung-Yeon Jang, In-Wook Hwang* and Shinuk Cho*



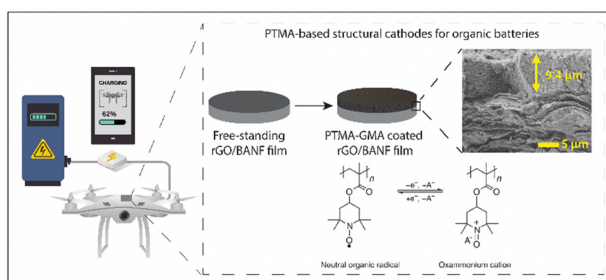
4877



Layer hybridized exciton–plasmon resonances for enhanced dispersion modes in CuS:Al nanostructured films

Harkawal Singh, Sandeep Kumar, Thakur Sudesh Kumar Raunija and Praveen Kumar Sharma*

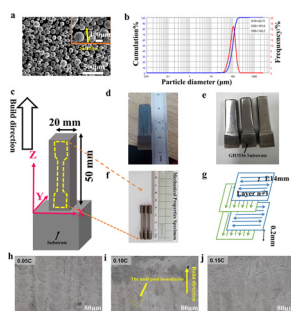
4886



Structural organic battery cathodes comprised of organic redox active polymers, reduced graphene oxide, and aramid nanofibers

Suyash S. Oka, Ratul Mitra Thakur, Alexandra D. Easley, Micah J. Green and Jodie L. Lutkenhaus*

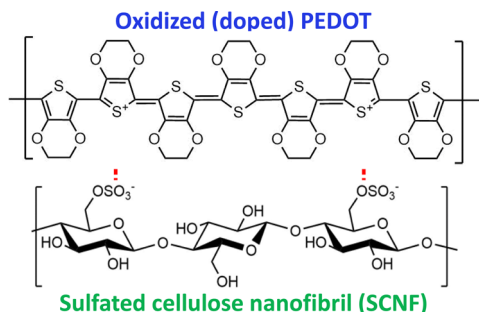
4897



Influence of carbon additions on microstructures and mechanical properties in additive manufactured superalloys

Mingjun Xie, Yan Zhao,* Jianjun Guan, Yanhong Yang* and Yuting Fu

4912



In situ polymerized PEDOT dispersions with sulfated cellulose nanofibrils for 1D and 2D conductors

Benjamin Pingrey and You-Lo Hsieh*

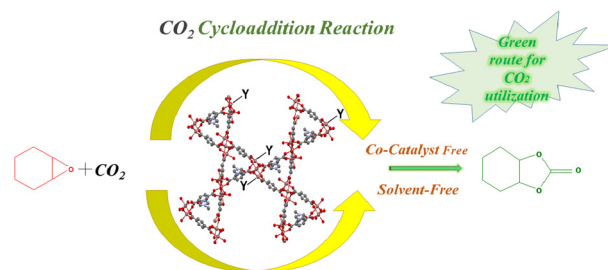


PAPERS

4921

Dicyano-functionalized indium framework as a heterogeneous catalyst for CO₂ fixation in the absence of solvent and co-catalyst

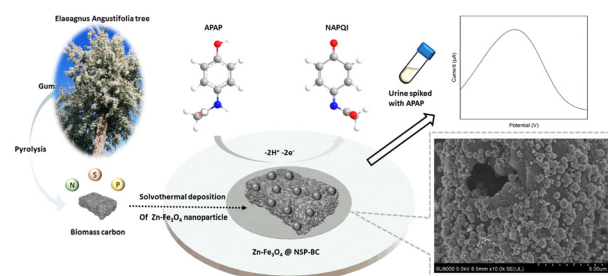
Naghmeh Bayati and Saeed Dehghanpour*



4929

A Zn-doped Fe₃O₄ nanoparticle@N, S and P doped Elaeagnus angustifolia gum derived carbon hybrid electrocatalyst: synthesis, characterization and electrochemical sensing of acetaminophen

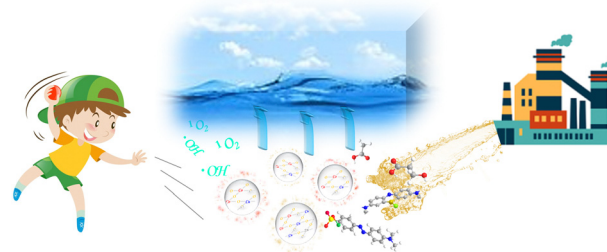
Xamxikamar Mamat, Zehong Gao and Longyi Chen*



4943

Enhanced catalytic activity of ZnO–CuO–Co₃O₄ composites achieved using a mechanochemical method for effective Fenton-like dye removal: the generation and catalytic mechanism of various superficial active sites

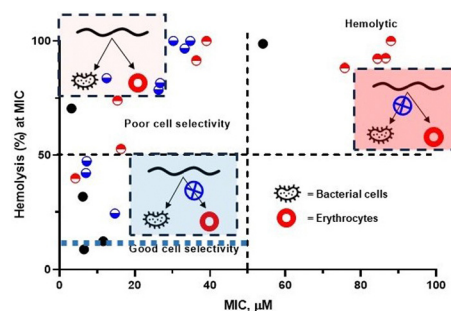
Xueping Li, Kangkang Miao, Sifan Guo, Nan Wang, Qian Zhuang, Huaming Qian, Xiaolin Luo* and Guodong Feng*



4954

Synthesis, characterization and cell selectivity of poly(quaternary ammonium chlorides): effect of the degree of quaternization and copolymer composition

Wendy Rusli, Periyah Mercy Halleluyah, Loh Xian Jun,* Rajamani Lakshminarayanan* and Anbanandam Parthiban*



PAPERS

4965



A smart nanopaper sensor for optical diagnosis of *Helicobacter pylori* infection

Zeinab Asghari Adib, Amir Reza Sharifi, Mohammad Ali Kiani, Hossein Yousefi, Daniel Horák, Uliana Kostiv, Ali Nabavi-Rad, Abbas Yadegar, Mohammad Yaghoubi-Avini and Hamed Golmohammadi*

CORRECTION

4975

Correction: 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*

