

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.

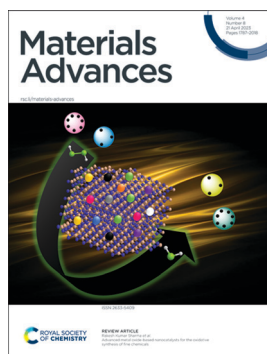
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(8) 1787-2018 (2023)



Cover

See M. Veronica Sofianos *et al.*, pp. 1905–1915. Image reproduced by permission of M. Veronica Sofianos from *Mater. Adv.*, 2023, 4, 1905. Artwork credit: Niall McNally.



Inside cover

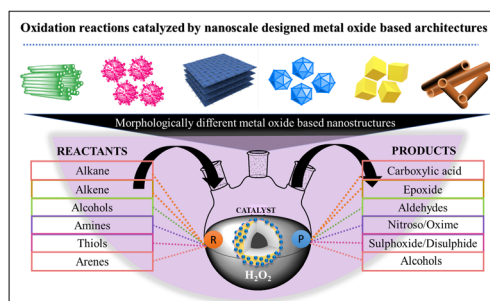
See Rakesh Kumar Sharma *et al.*, pp. 1795–1830. Image reproduced by permission of Rakesh Kumar Sharma from *Mater. Adv.*, 2023, 4, 1795.

REVIEWS

1795

Advanced metal oxide-based nanocatalysts for the oxidative synthesis of fine chemicals

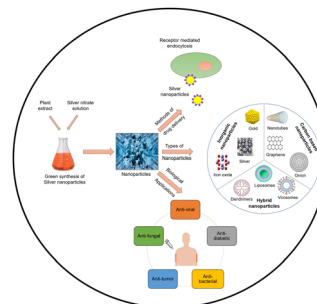
Rakesh Kumar Sharma,* Rakeshwar Bandichhor, Vishwesh Mishra, Shivani Sharma, Sneha Yadav, Shilpa Mehta, Bhavya Arora, Pooja Rana, Sriparna Dutta and Kanika Solanki



1831

Green synthesis of silver nanoparticles: methods, biological applications, delivery and toxicity

Vidyasagar, Ritu Raj Patel, Sudhir Kumar Singh and Meenakshi Singh*



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
Jiang Chang, Shanghai Institute of Ceramics, China
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
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 Jurcescu, 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
Marc in het Panhuis, University of

Wollongong, Australia
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
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

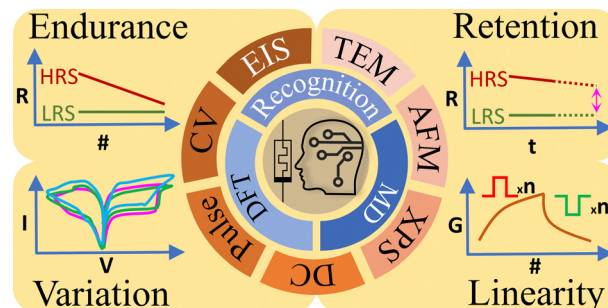


REVIEWS

1850

Enhancing memristor fundamentals through instrumental characterization and understanding reliability issues

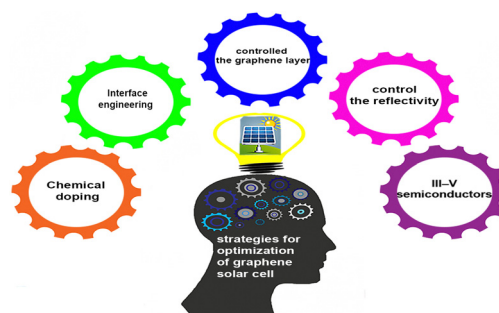
Fei Qin, Yuxuan Zhang, Han Wook Song and Sunghwan Lee*



1876

Rational and key strategies toward enhancing the performance of graphene/silicon solar cells

Parisa Fallahzad

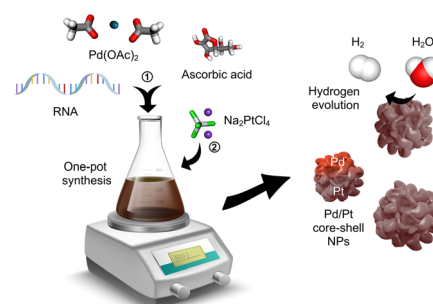


COMMUNICATION

1900

Green one-pot synthesis of bimetallic Pd–Pt nanosponges using biomolecules with enhanced catalytic activity for hydrogen evolution reactions

Fuat Topuz,* Bhushan Patil and Tamer Uyar*

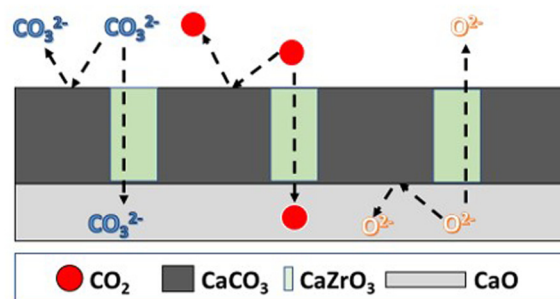


PAPERS

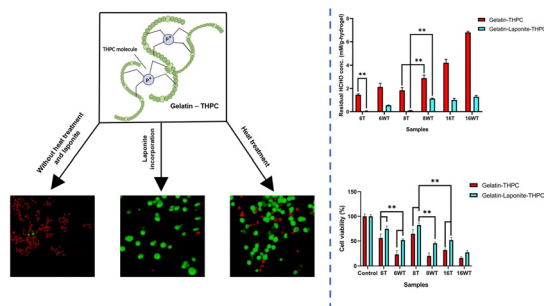
1905

Upcycling natural Limestone waste for thermochemical energy storage by utilising tailored CaZrO₃ nanoadditives

Rehan Anwar, Jan Navrátil, Rajani K. Vijayaraghavan, Patrick J. McNally, Michal Otyepka, Piotr Btoński and M. Veronica Sofianos*



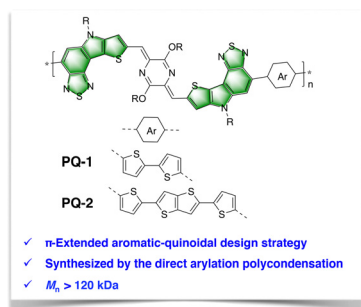
1916



Development of cytocompatible protein-based hydrogels crosslinked using tetrakis(hydroxymethyl)phosphonium chloride

Jatin Jawhir Pandit, Archita Shrivastava, Tanmay Bharadwaj and Devendra Verma*

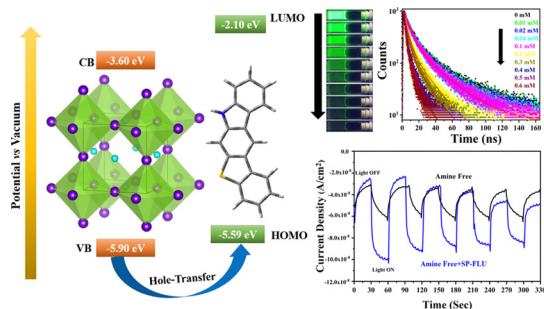
1927



6*H*-[1,2,5]Thiadiazolo[3,4-*e*]thieno[3,2-*b*]indole-flanked *para*-azaquinodimethane based aromatic-quinoidal polymer semiconductors with high molecular weights synthesized *via* direct arylation polycondensation

Yufa Xiao, Huajie Fu, Zefeng Li, Yingxuan Zheng, Ping Deng,* Yanlian Lei* and Yan Yu*

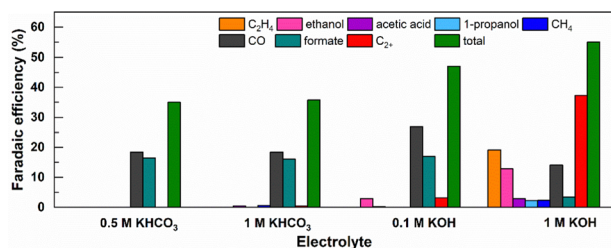
1935



Surface engineering of CsPbBr₃ perovskite nanocrystals: hole transfer dynamics and enhanced photocurrent response using a novel organic molecule

D. Venkateswarlu, T. Swetha, Syed Akhil, Manoj Palabathuni, Nimai Mishra and Surya Prakash Singh*

1941



Control of evolution of porous copper-based metal-organic materials for electroreduction of CO₂ to multi-carbon products

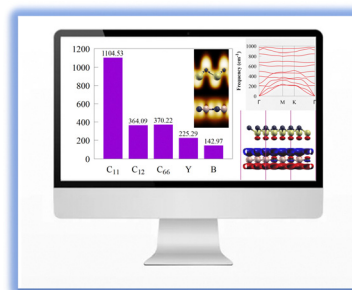
Lili Li, Lutong Shan, Alena M. Sheveleva, Meng He, Yujie Ma, Yiqi Zhou, Marek Nikiel, Laura Lopez-Odrozola, Louise S. Natrajan, Eric J. L. McInnes, Martin Schröder,* Sihai Yang* and Floriana Tuna*



1949

Rational design of 2D/2D CS/SiC van der Waals type-II heterojunctions: a visible-light-driven photocatalyst for hydrogen production

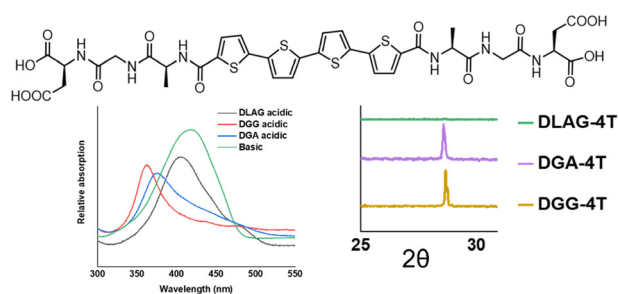
Francis Opoku,* Osei Akoto, Edward Ebow Kwaansa-Ansah, Noah Kyame Asare-Donkor and Anthony Apeke Adimado



1964

Relation among absorbance shifts, mineralization morphology, and electronic conductivity of π -peptide aggregates with different amino acid residues

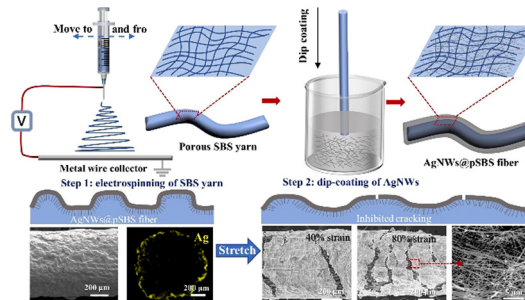
Taein Lee, Sayak Subhra Panda, Grant E. K. Hall, Yunjia Song, John D. Tovar and Howard E. Katz*



1978

An electrically stable and mechanically robust stretchable fiber conductor prepared by dip-coating silver nanowires on porous elastomer yarn

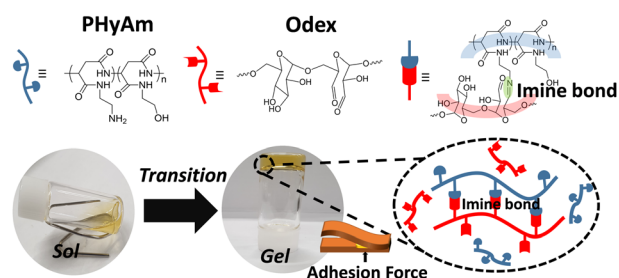
Xin He, Ningjing Zhou, Yushan Li, Puxian Xiong, Shuai Zhang* and Zhijun Ma*



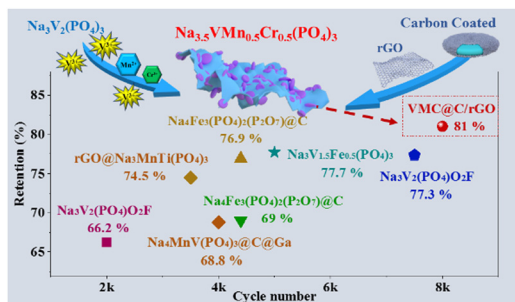
1989

Preparation of polyaspartamide-based adhesive hydrogels via Schiff base reaction with aldehyde-functionalized dextran

Hend A. Hegazy, Hwi Hyun Moon, Dong-Hyun Lee, Suk Ho Bhang, Youn-Chul Kim,* Changsik Song* and Ji-Heung Kim*



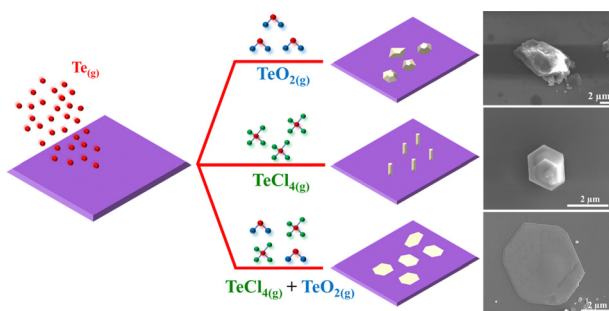
1998



Hierarchical cathode constructed by carbon coated $\text{Na}_{3.5}\text{VMn}_{0.5}\text{Cr}_{0.5}(\text{PO}_4)_3$ nanoparticles on rGO for high-capacity and long-cycle life sodium storage

Jinhao Wang, Longzhu Zhao and Fengqi Lu*

2008



Chloride-assisted synthesis of tellurene directly on SiO_2/Si substrates: growth mechanism, thermal properties, and device applications

Yi-Hsun Chan, Che-Yi Lin, Yu-Chang Chou, Alice Chinghsuan Chang, Yen-Fu Lin and Yu-Ze Chen*

