

Materials Advances

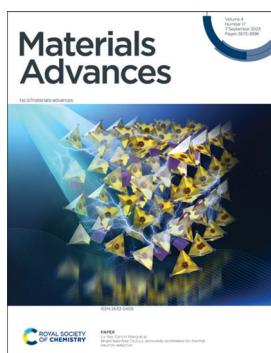
An open access journal publishing across the breadth of materials science

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.

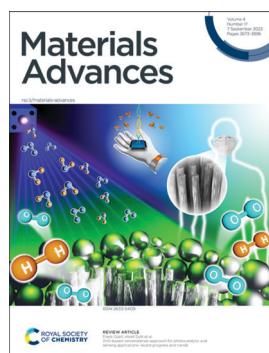
IN THIS ISSUE

ISSN 2633-5409 CODEN MAADC9 4(17) 3673–3896 (2023)



Cover

See Lu Yao, Cai Lin Wang et al., pp. 3714–3723.
Image reproduced by permission of Lu Yao from Mater. Adv., 2023, 4, 3714.



Inside cover

See Frank Güell, Ateet Dutt et al., pp. 3685–3707.
Image reproduced by permission of Ateet Dutt from Mater. Adv., 2023, 4, 3685.

EDITORIAL

3682

Advanced functional materials and manufacturing processes

Jessica O. Winter,* Jawaad A. Darr* and John Wang*

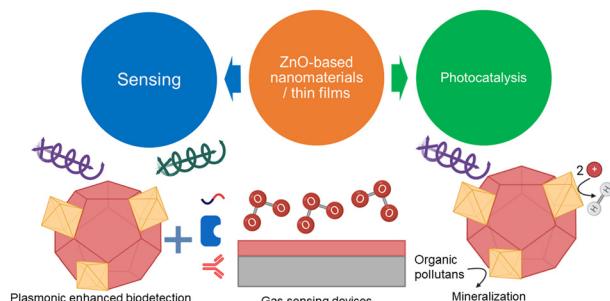


REVIEW

3685

ZnO-based nanomaterials approach for photocatalytic and sensing applications: recent progress and trends

Frank Güell,* Andrés Galdámez-Martínez, Paulina R. Martínez-Alanis, Ariadne C. Catto, Luís F. da Silva, Valmor R. Mastelaro, Guillermo Santana and Ateet Dutt*



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 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
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

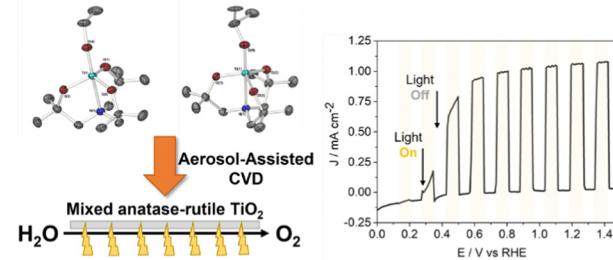


COMMUNICATION

3708

Aerosol-assisted chemical vapour deposition of highly efficient mixed anatase-rutile TiO_2 for photoelectrochemical water splitting

Thom R. Harris-Lee, Enrico Della Gaspera, Frank Marken, Jie Zhang, Cameron L. Bentley and Andrew L. Johnson*

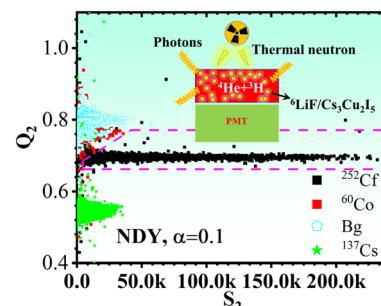


PAPERS

3714

Bright lead-free $\text{Cs}_3\text{Cu}_2\text{I}_5$ perovskite scintillators for thermal neutron detection

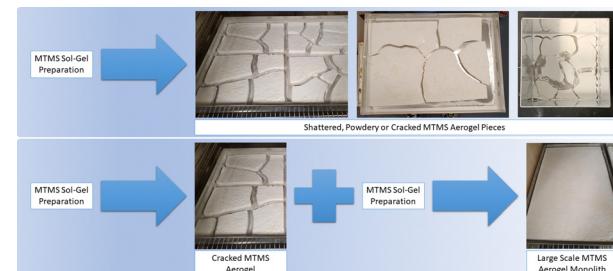
Lu Yao,* Wanting Gui, Xunsheng Zhou, Chao Li, Shi Zhang, Jing Kui Zhao and Cai Lin Wang*



3724

Large scale recyclable monolithic methyltrimethoxysilane aerogels formed by self-reinforcement

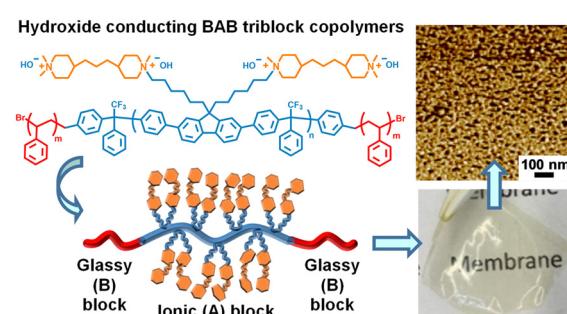
Gylen Odling,* Hannah Logan, Aaron Chan, Andrew J. Bissel, Colin R. Pulham and David E. Oliver



3733

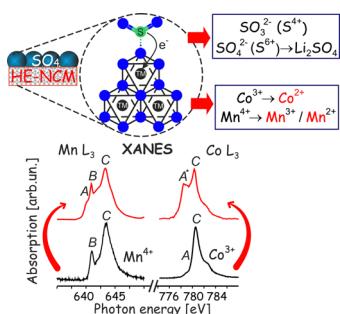
Hydroxide conducting BAB triblock copolymers tailored for durable high-performance anion exchange membranes

Andrit Allushi, Pegah Mansouri Bakvand, Haiyue Gong and Patric Jannasch*



PAPERS

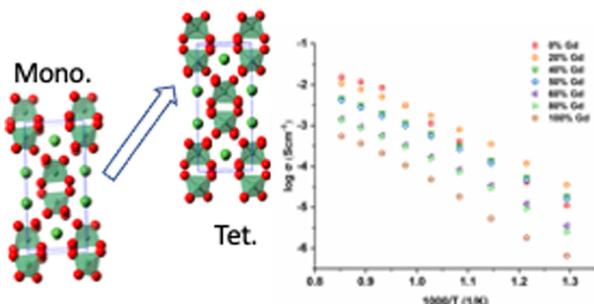
3746



Impact of thermal gas treatment on the surface modification of Li-rich Mn-based cathode materials for Li-ion batteries

Maximilian Mellin, Zhili Liang, Hadar Sclar, Sandipan Maiti, Igor Piš, Silvia Nappini, Elena Magnano, Federica Bondino, Ilargi Napal, Robert Winkler, Réne Hausbrand, Jan P. Hofmann, Lambert Alff, Boris Markovsky, Doron Aurbach, Wolfram Jaegermann and Gennady Cherkashinin*

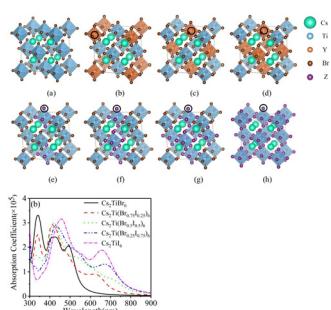
3759



Investigation of the crystal structure and electrochemical performance of Gd doped $\text{LaNb}_{0.9}\text{Mo}_{0.1}\text{O}_{4.05}$

Yidong Han and Stephen J. Skinner*

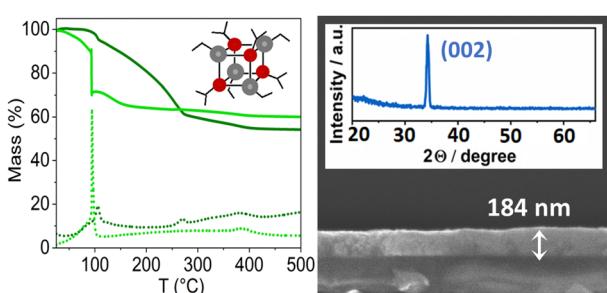
3767



The modulation of the electrical and optical properties of Cs_2TiBr_6 by doping

Jianwei Wei,* Junhua Wu, Yunyun Wang, Yuze Zhang, Zengwei Ma, Chenkai Qiao and Hui Zeng

3774



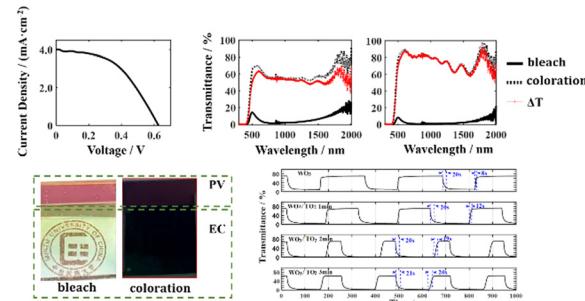
Self-textured ZnO via AACVD of alkyl alkoxides: a solution-based seed-less route towards optoelectronic-grade coatings

Clara Sanchez-Perez,* Sriluxmi Srimuruganathan, Carlos Sotelo-Vazquez, Sanjayan Sathasivam, Mingyue Wang, Javier Marugán, Ivan P. Parkin and Claire J. Carmalt*



PAPERS

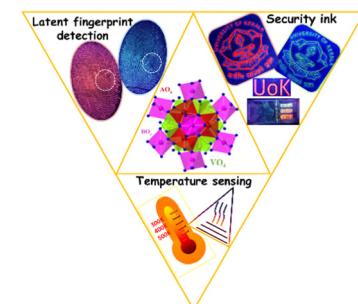
3787

The effect of the TiO_2 interface layer on the electrochromic properties of WO_3 -based devicesPanshu Gui, Ziyi Jin, Yufeng Bai, Zhengqiao Lv, Jianwei Mo, Shuai Chang and Di Yang*
Open Access Article. Published on 29 August 2023. Downloaded on 2/17/2026 8:17:36 AM.
This article is licensed under a Creative Commons Attribution 3.0 Unported Licence.

3796

Delving into the multifunctionality of $\text{Sr}_2\text{NaMg}_2\text{V}_3\text{O}_{12}$ via RE^{3+} substitution for dual-mode temperature sensing, latent fingerprint detection and security inks

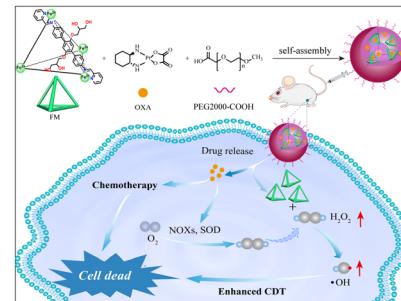
Amrithakrishnan Bindhu, Jawahar Isuhak Naseemabeevi and Subodh Ganesanpotti*



3813

Water-soluble ferrous metallacage combined with oxaliplatin for a synergistic chemo/chemodynamic therapy

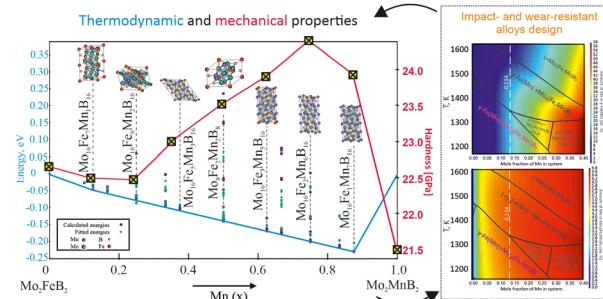
Jing He, Wei He, Run Wang, Jingjing Jiao* and Shiping Yang*



3822

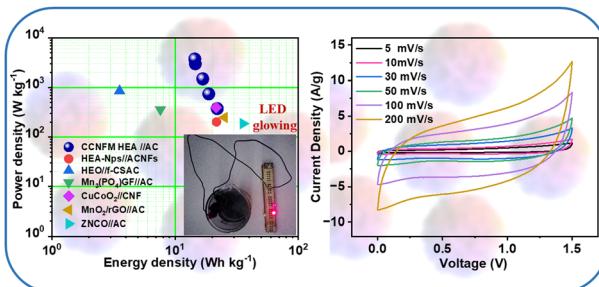
The thermodynamic and mechanical properties of Earth-abundant metal ternary boride $\text{Mo}_2(\text{Fe},\text{Mn})\text{B}_2$ solid solutions for impact- and wear-resistant alloys

Pavlo Prysyazhnyuk* and Devis Di Tommaso

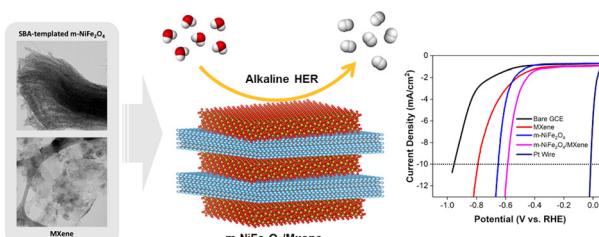


PAPERS

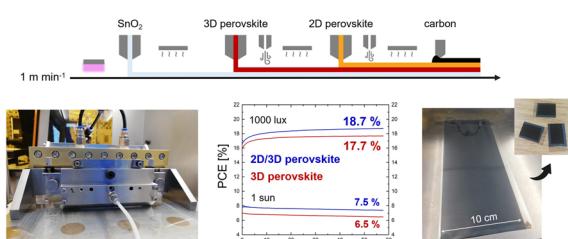
3839



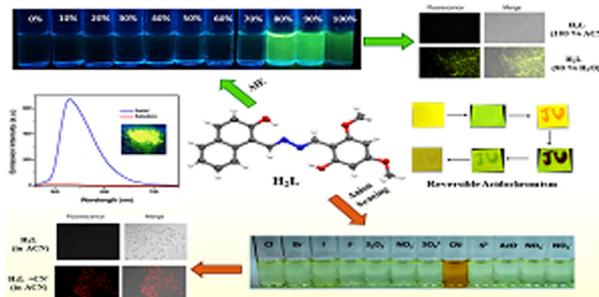
3853



3863

MANUFACTURING PROCEDURE FOR FLEXIBLE PEROVSKITE SOLAR CELLS
LOW-COST | LARGE SCALE DEPOSITION | AMBIENT ATMOSPHERE | LOW TEMPERATURE

3874



High energy density liquid state asymmetric supercapacitor devices using Co-Cr-Ni-Fe-Mn high entropy alloy

Gobinda C. Mohanty, Chinmayee C. Gowda, Pooja Gakhad, M. Sanjay, Suman Sarkar, Koushik Biswas,* Abhishek Singh* and Chandra S. Tiwary*

A SBA-15-templated mesoporous NiFe₂O₄/MXene nanocomposite for the alkaline hydrogen evolution reaction

Munawar Khalil,* Michael Lesa, Alexander G. Juandito, Afiten R. Sanjaya, Tribidasari A. Ivandini, Grandprix T. M. Kadja, Muhammad Haris Mahyuddin, Mehran Sookhakian and Yatimah Alias

Fabrication of low-cost and flexible perovskite solar cells by slot-die coating for indoor applications

Cristina Teixeira, Rosinda Fuentes-Pineda, Luísa Andrade, Adélio Mendes and Dávid Forgács*

Naphthyl-azine – aggregation induced emission, reversible acidochromism, cyanide sensing and its application in intracellular imaging

Sukanya Paul, Kingshuk Debsharma, Sunanda Dey, Satyajit Halder, Kuladip Jana and Chittaranjan Sinha*



CORRECTIONS

3892

Correction: 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 Junqiao Ding*

3893

Correction: Large scale recyclable monolithic methyltrimethoxysilane aerogels formed by self-reinforcement

Gylen Odling,* Hannah Logan, Aaron Chan, Andrew J. Bissell, Colin R. Pulham and David E. Oliver

