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

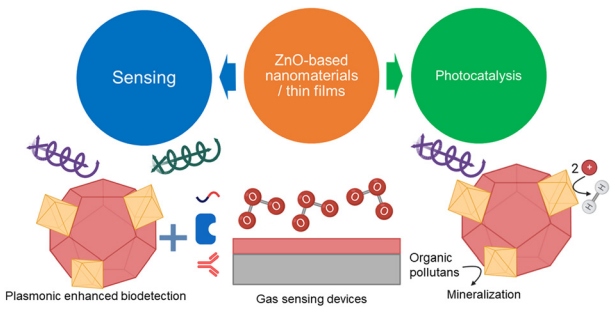
Jessica O. Winter,* Jawwad A. Darr* and John Wang*

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*



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**

Materials Advances

rsc.li/materials-advances

Materials Advances publishes experimental and theoretical work across the breadth of materials science.

Editorial Board

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.

Registered charity number: 207890

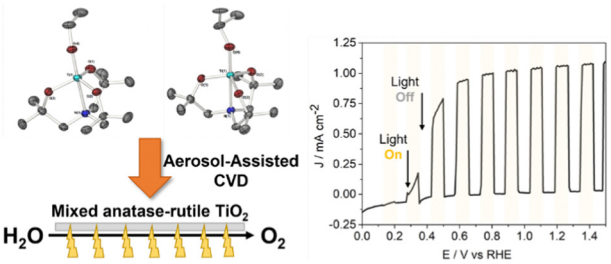
ROYAL SOCIETY OF CHEMISTRY

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*

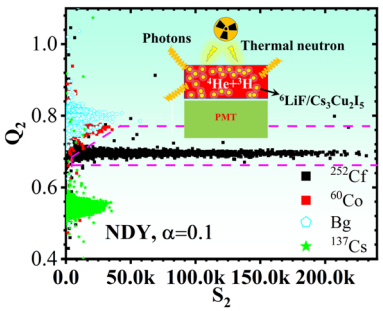


PAPERS

3714

Bright lead-free $Cs_3Cu_2I_5$ perovskite scintillators for thermal neutron detection

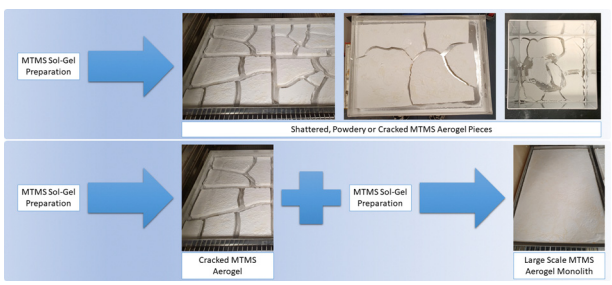
Lu Yao,* Wanting Gui, Xunsheng Zhou, Chao Li, Shi Zhang, Jing Kui Zhao and Cai Lin Wang*



3724

Large scale recyclable monolithic methyltrimethoxysilane aerogels formed by self-reinforcement

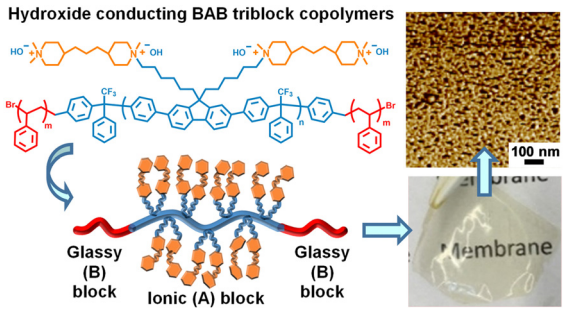
Gylen Odling,* Hannah Logan, Aaron Chan, Andrew J. Bissel, Colin R. Pulham and David E. Oliver



3733

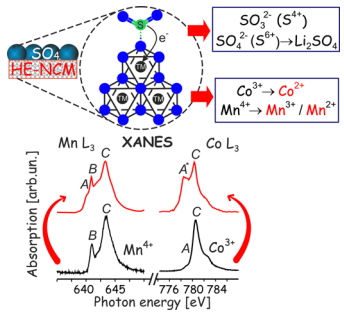
Hydroxide conducting BAB triblock copolymers tailored for durable high-performance anion exchange membranes

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



PAPERS

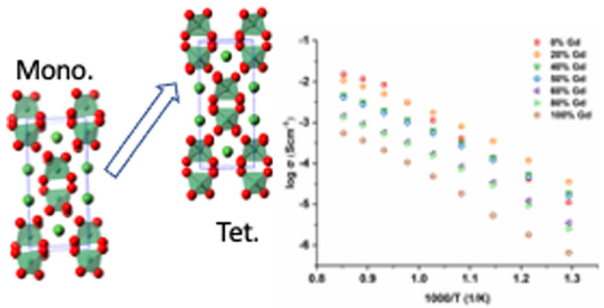
3746



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 Píš, 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*

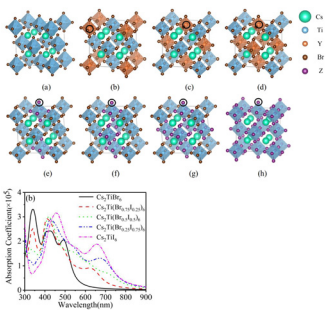
3759



Investigation of the crystal structure and electrochemical performance of Gd doped $LaNb_{0.9}Mo_{0.1}O_{4.05}$

Yidong Han and Stephen J. Skinner*

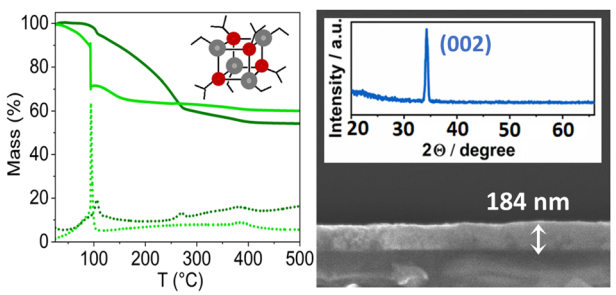
3767



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

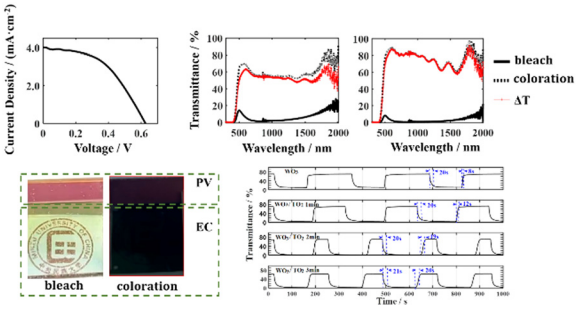
Clara Sanchez-Perez,* Sriluxmi Srimurugananthan, Carlos Sotelo-Vazquez, Sanjayan Sathasivam, Mingyue Wang, Javier Marugán, Ivan P. Parkin and Claire J. Carmalt*

PAPERS

3787

The effect of the TiO_2 interface layer on the electrochromic properties of WO_3-based devices

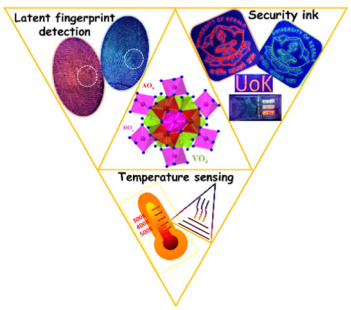
Panshu Gui, Ziyi Jin, Yufeng Bai, Zhengqiao Lv, Jianwei Mo, Shuai Chang and Di Yang*



3796

Delving into the multifunctionality of $Sr_2NaMg_2V_3O_{12}$ *via* RE^{3+} substitution for dual-mode temperature sensing, latent fingerprint detection and security inks

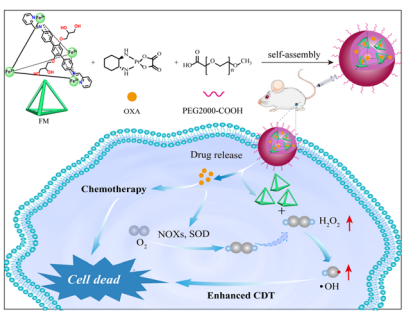
Amrithakrishnan Bindhu, Jawahar Isuhak Naseemabeevi and Subodh Ganesanpotti*



3813

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

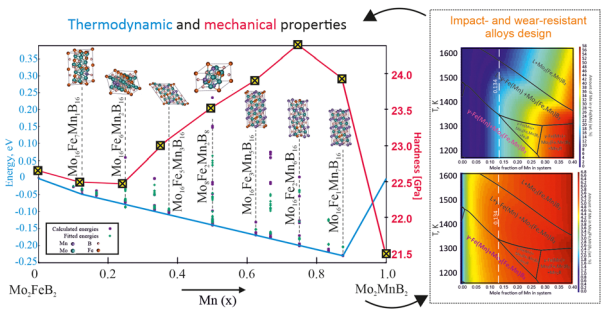
Jing He, Wei He, Run Wang, Jingjing Jiao* and Shiping Yang*



3822

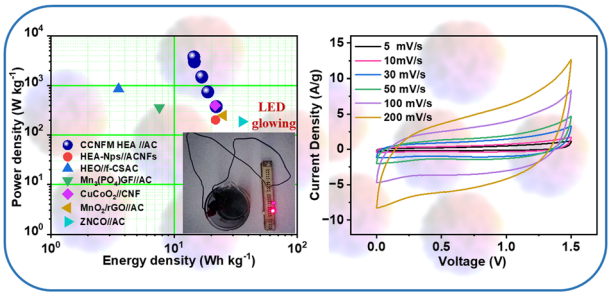
The thermodynamic and mechanical properties of Earth-abundant metal ternary boride $Mo_2(Fe,Mn)B_2$ solid solutions for impact- and wear-resistant alloys

Pavlo Prysyazhnyuk* and Devis Di Tommaso



PAPERS

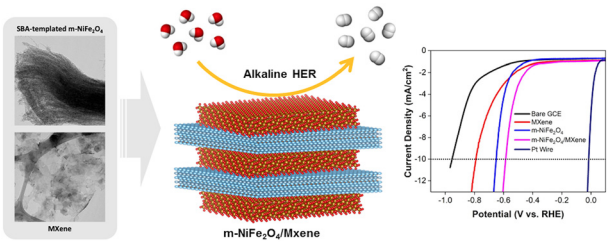
3839



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*

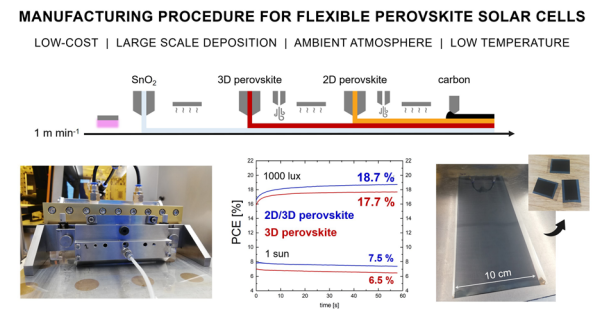
3853



A SBA-15-templated mesoporous $NiFe_2O_4$/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

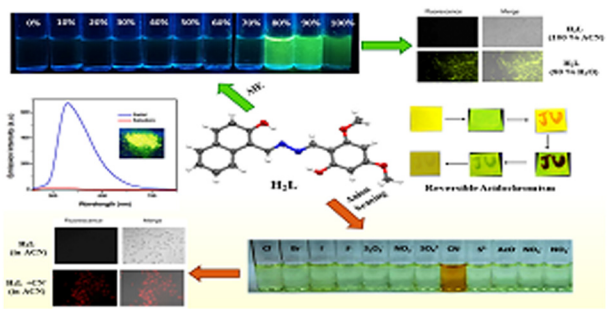
3863



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*

3874



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