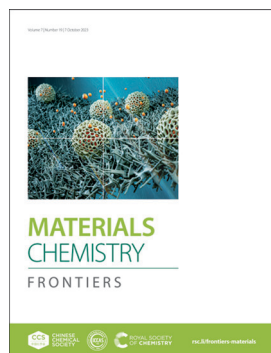


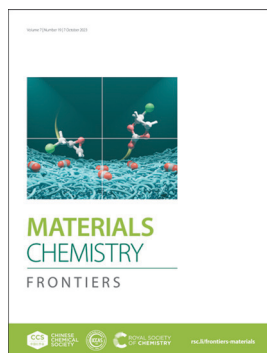
IN THIS ISSUE

ISSN 2052-1537 CODEN MCFAC5 7(19) 4167-4586 (2023)



Cover

See Agnes Schulze *et al.*, pp. 4460–4472. Image reproduced by permission of Zahra Niavarani and Ehsan Faridi from *Mater. Chem. Front.*, 2023, 7, 4460.



Inside cover

See Charl F. J. Faul *et al.*, pp. 4473–4481. Image reproduced by permission of Marcos Villeda Hernandez from *Mater. Chem. Front.*, 2023, 7, 4473.

CHEMISTRY FRONTIERS

4177

Emerging functional materials in solid-contact potentiometric sensing, a field full of vitality

Ke Qu* and Jinghong Li*

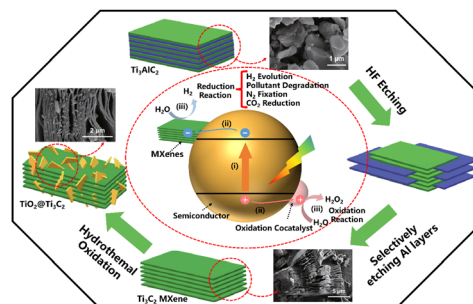


REVIEWS

4184

Recent advances in MXenes: a promising 2D material for photocatalysis

Noor Shah, Xinyu Wang and Jian Tian*



EDITORIAL STAFF

Executive Editor

Wenjun Liu

Deputy Editor

Kailin Deng

Development Editor

Cheng Du

Editorial Production Manager

Helen Saxton

Senior Publishing Editor

Becky Webb

Publishing Editors

Kirstine Anderson, Matthew Bown, Laura Cooper, Hannah Fielding, Clare Fitzgerald, Anoushka Handa, Claire Harding, Alan Holder, Charlie Palmer, Rosie Rothwell, Donna Smith, Laura Smith

Assistant Editors

Jie Gao, Yu Zhang

Publisher

Jeanne Andres

For queries about submitted papers, please contact Helen Saxton, Editorial Production Manager, in the first instance. E-mail: MaterChemFrontiersPROD@rsc.org

For pre-submission queries please contact Wenjun Liu, Executive Editor. Email: MaterChemFrontiersED@rsc.org

Materials Chemistry Frontiers (electronic: ISSN 2052-1537) is published 24 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

All orders, with cheques made payable to the Royal Society of Chemistry, should be sent to RSC 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

2023 Annual (electronic) subscription price: £1,369; US\$2,247. Customers in Canada will be subject to a surcharge to cover GST. Customers in the EU subscribing to the electronic version only will be charged VAT.

If you take an institutional subscription to any Royal Society of Chemistry journal you are entitled to free, site-wide web access to that journal. You can arrange access via Internet Protocol (IP) address at www.rsc.org/ip

Customers must make payments by cheque in sterling payable on a UK clearing bank or in US dollars payable on a US clearing bank. 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 CHEMISTRY

FRONTIERS

An international, high impact journal for cutting-edge researches from all disciplines of materials chemistry.



CHINESE
CHEMICAL
SOCIETY



rsc.li/frontiers-materials

Published in collaboration with the Chinese Chemical Society and Institute of Chemistry, Chinese Academy of Sciences

Editorial Board

Editor-in-Chief

Shu-Hong Yu, University of Science and Technology of China, China

Associate Editors

Shu Seki, Kyoto University, Japan
Andrea Tao, University of California, San Diego, USA

Dan Wang, Institute of Process Engineering, Chinese Academy of Sciences, China
Guillaume Wantz, Université de Bordeaux, France
Huanghao Yang, Fuzhou University, China

Members

Feihe Huang, Zhejiang University, China
Zhen Li, Wuhan University, China
Marina A. Petrunkina, University at Albany, USA
Kazuo Tanaka, Kyoto University, Japan

Advisory Board

Takuzo Aida, The University of Tokyo, Japan
J Paul Attfield, University of Edinburgh, UK
Guillermo C Bazan, UC Santa Barbara, USA
Liming Ding, National Center for Nanoscience and Technology, China
Xinliang Feng, Technische Universität Dresden, Germany
Jiaxing Huang, Northwestern University, USA
Parameswar K. Iyer, Indian Institute of Technology Guwahati, India
Samson Jenekhe, University of Washington, USA
Hua Kuang, Jiangnan University, China
Mario Leclerc, Université Laval, Canada
Xingjie Liang, National Center for Nanoscience and Technology, China
Bin Liu, National University of Singapore, Singapore
Dongsheng Liu, Tsinghua University, China
Shaoqin Liu, Harbin Institute of Technology, China
Xianjun Loh, Institute of Materials Research

and Engineering, Singapore
Mark J MacLachlan, University of British Columbia, Canada
Krzysztof Matyjaszewski, Carnegie Mellon University, USA
Klaus Mullen, Max Planck Institute for Polymer Research, Germany
Thuc Quyen Nguyen, University of California, Santa Barbara, USA
Kyoko Nozaki, The University of Tokyo, Japan
Anjun Qin, South China University of Technology, China
Olof Ramström, University of Massachusetts Lowell, USA
John Reynolds, Georgia Institute of Technology, USA
Ulrich Scherf, University of Wuppertal, Germany
Patrick Théato, Karlsruhe Institute of Technology, Germany
Christoph Weder, University of Fribourg, Switzerland

Karen L. Wooley, Texas A&M University, USA
James Wuest, Université de Montréal, Canada
Dongsheng Xu, Peking University, China
Jiannian Yao, Institute of Chemistry, Chinese Academy of Sciences, China
Juyoung Yoon, Ewha Womans University, South Korea
Jihong Yu, Jilin University, China
Deqing Zhang, Institute of Chemistry, Chinese Academy of Sciences, China
Hua Zhang, City University of Hong Kong, China
Qichun Zhang, City University of Hong Kong, China
Tierui Zhang, Technical Institute of Physics and Chemistry, China
Xi Zhang, Tsinghua University, China
Yuliang Zhao, National Center for Nanoscience and Technology, China
Wei Hong Zhu, East China University of Science & Technology, China

Community Board

Tayeb Ameri, University of Munich, Germany
Derya Baran, King Abdullah University of Science and Technology, Saudi Arabia
Xiaoyu Cao, Xiamen University, China
Changle Chen, University of Science and Technology of China, China
Sijie Chen, Karolinska Institutet, Hong Kong, China
Dan Ding, Nankai University, China
Kenneth Graham, University of Kentucky, USA

Xinggui Gu, Beijing University of Chemical Technology, China
Yuning Hong, La Trobe University, Australia
Zhong'an Li, Huazhong University of Science and Technology, China
Yingying Lu, Zhejiang University, China
T. N. Narayanan, Tata Institute of Fundamental Research, India
Shohei Saito, Kyoto University, Japan
Youhong Tang, Flinders University, Australia
Takaya Terashima, Kyoto University, Japan
Reji Varghese, Indian Institute of Science Education and Research, India

Jiangyan Wang, Institute of Process Engineering, Chinese Academy of Sciences, China
Yan Wei, Peking University School and Hospital of Stomatology, China
Haihua Xiao, Institute of Chemistry, Chinese Academy of Sciences, China
Yurui Xue, Shandong University, China
Jing Yu, Nanyang Technological University, Singapore
Guoqing Zhang, University of Science and Technology of China, China

Information for Authors

Full details on how to submit material for publication in Materials Chemistry Frontiers 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/frontiers-materials

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 Partner Organisations 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

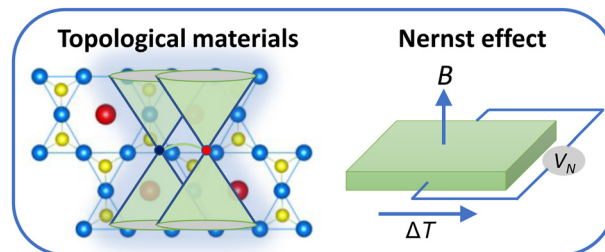


REVIEWS

4202

Topological quantum magnets for transverse thermoelectric energy conversion

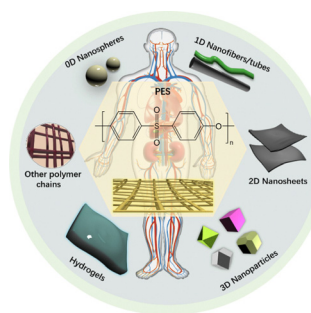
Anil Kumar B. M. and Satya N. Guin*



4215

Progress of polyethersulfone composites and their applications in biomedical engineering

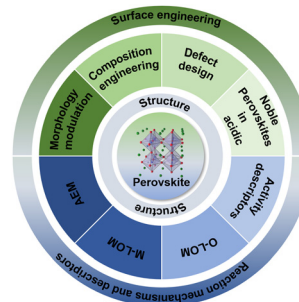
Yuanhang Cao, Jiemin Wang,* Changsheng Zhao, Dan Liu and Weiwei Lei*



4236

Regulation engineering of the surface and structure of perovskite-based electrocatalysts for the oxygen evolution reaction

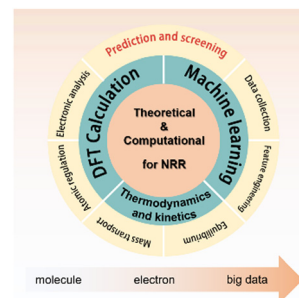
Ning Yu, Zhi-Jie Zhang, Yong-Ming Chai* and Bin Dong*

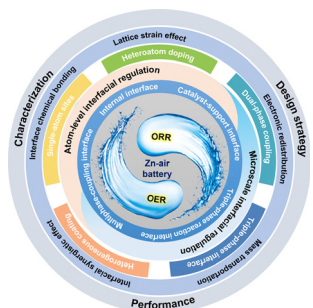


4259

Accelerating the development of electrocatalysts for electrochemical nitrogen fixation through theoretical and computational approaches

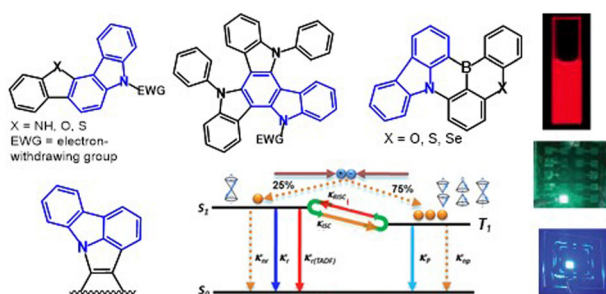
Shuyue Wang, Chao Qian and Shaodong Zhou*





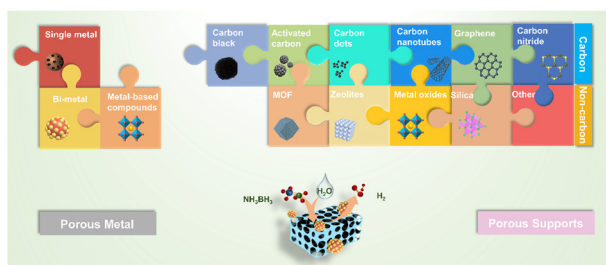
Yunrui Li, Libo Zhang, Ying Han, Wenxi Ji,
Zhongyuan Liu, Baoshun Wang, Siming Zhao,
Xueke Wu, Longgui Zhang* and Rufan Zhang*

4304



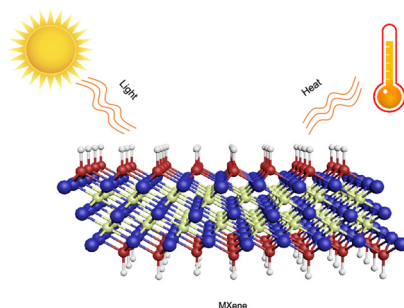
Saliha Oner and Martin R. Bryce*

4339



Dan Liu, Cheng Zhou, Zhimao Yang, Ge Wang,
Chuncaì Kong* and Ben Liu*

4372



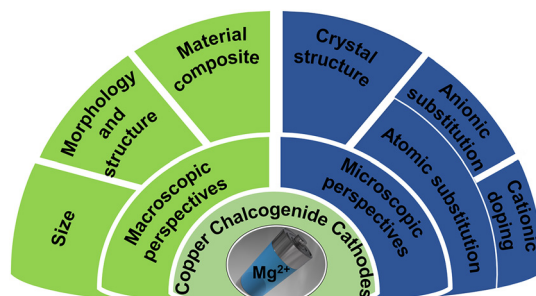
Haozi Lu, Junhua Wang, Huimin Li, Wei Zhou,*
Quan Yuan* and Song Liu*

REVIEWS

4400

Current material design strategies on the copper chalcogenide cathodes for rechargeable magnesium batteries: a review

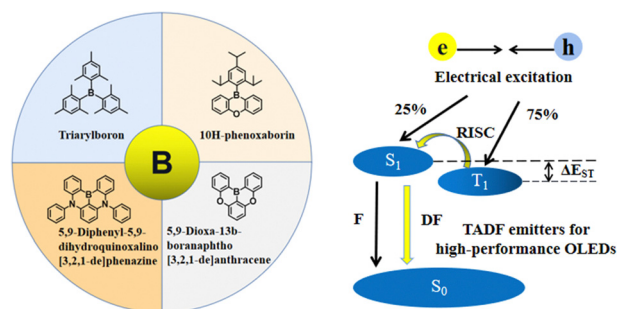
Xin Liu, Qianwei Zhang, Changliang Du, Xiao Du, Youqi Zhu* and Chuanbao Cao*



4420

Recent advances and prospects for organoboron-based thermally activated delayed fluorescence emitters

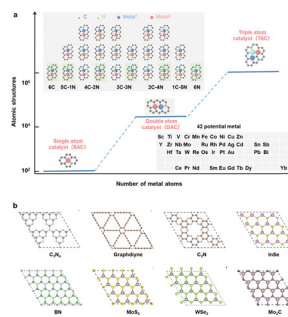
Liang Wan, Zhuang Cheng, Futong Liu and Ping Lu*



4445

Machine learning enabled rational design of atomic catalysts for electrochemical reactions

Lianping Wu and Teng Li*

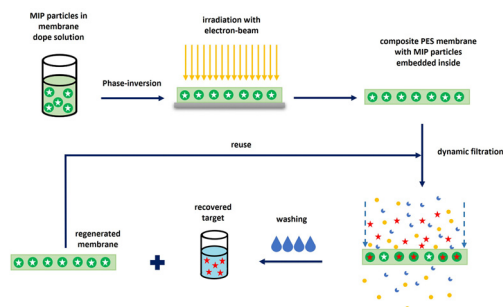


RESEARCH ARTICLES

4460

Synthesis of composite imprinted polymer membranes for the selective removal of 17 β -estradiol from water

Zahra Niavarani, Daniel Breite, Andrea Prager, Isabell Thomas, Mathias Kuehnert, Bernd Abel, Roger Gläser and Agnes Schulze*

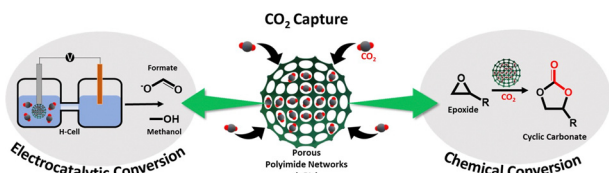


RESEARCH ARTICLES

4473

Bifunctional metal-free porous polyimide networks for CO₂ capture and conversion

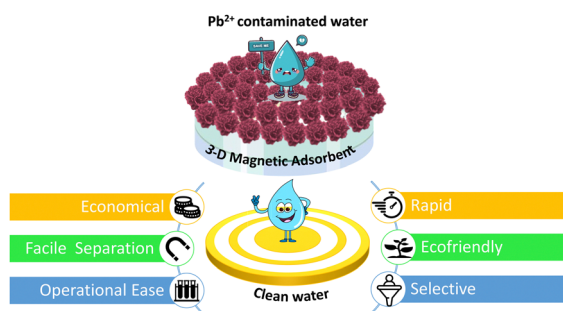
Basiram Brahma Narzary, Ulzhalgas Karatayeva, Jerry Mintah, Marcos Villeda-Hernandez and Charl F. J. Faul*



4482

A structurally engineered flower shaped magnetic hierarchical sorbent for rapid and selective uptake of Pb²⁺ ions from water samples

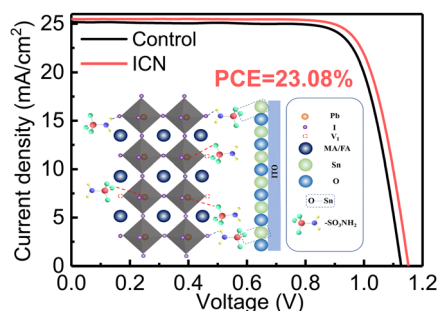
Kanika Solanki, Shivani Sharma, Pooja Rana, Bhawna Kaushik, Sneha Yadav, Ranjana Dixit, Ankush V. Birdar, Ashu Gupta and R. K. Sharma*



4497

An interdiffusion-controlled nucleation strategy for efficient sequential deposition of perovskite photovoltaics

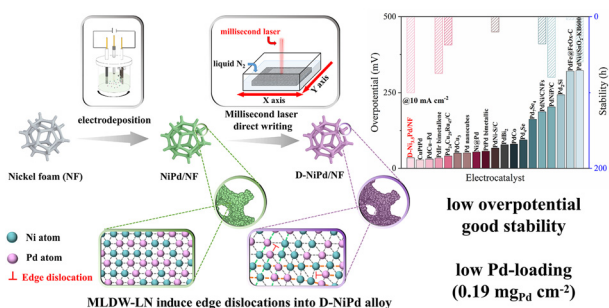
Chenglin Wang, Zuolin Zhang, Xuefan Zhao, Yunfei Zhu, Mengjia Li, Jike Ding and Cong Chen*



4508

Activating self-supported NiPd electrodes by laser-direct-writing for efficient hydrogen evolution reaction

Zihan Zhou, Liyang Xiao, Jun Zhao, Miao Zhou, Jingtong Zhang, Xiwen Du and Jing Yang*

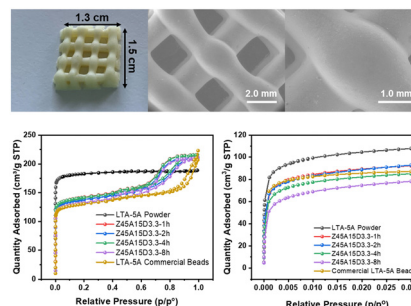


RESEARCH ARTICLES

4518

Preparation of zeolite-based porous materials via photopolymerization and their applications in 3D printing and gas storage

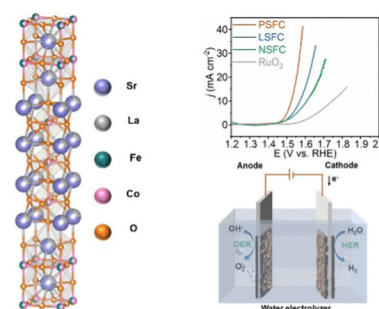
Yijun Zhang, Yuanyuan Gao, Ludovic Josien, Cyril Vaultot, Angélique Simon-Masseron* and Jacques Lalevée*



4526

Engineering the oxygen-evolution activity by changing the A-site rare-earth elements in $\text{RSr}_3\text{Fe}_{1.5}\text{Co}_{1.5}\text{O}_{10-\delta}$ (R = La, Nd, Pr) Ruddlesden–Popper perovskites

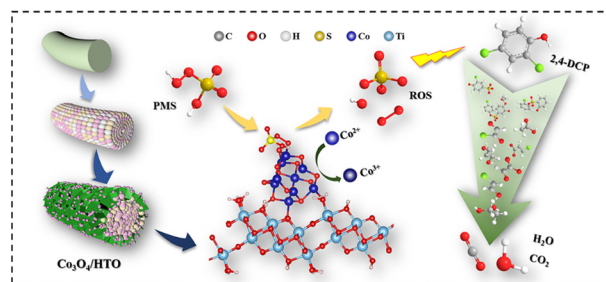
Wen Yun Zhu, Jiani Chen, Dongliang Liu, Guangming Yang, Wei Zhou, Ran Ran, Jie Yu* and Zongping Shao*



4535

Hydrogen titanate nanosheet-assembled fibers as a new matrix to promote the Co-activated PMS process for efficient polychlorinated phenol degradation

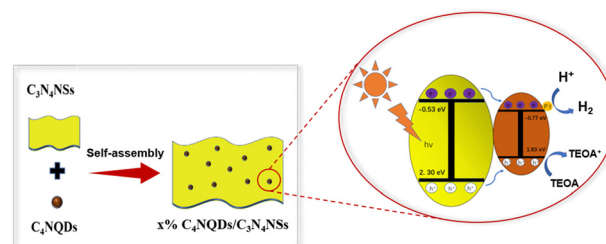
Qiaobao Ding, Mang Niu, Hong Su,* Zhanyin Liu, Jianfei Gao, Yanhui Zhao, Chunlei Liu, Yuan Liu* and Chunzhao Liu*



4547

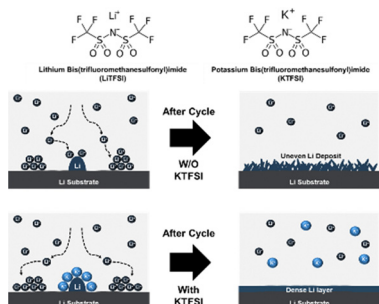
C_4N_4 quantum dots/g- C_3N_4 nanosheets organic homogeneous structure self-assembly for efficient charge separation and photocatalytic hydrogen evolution

Wenjie Wang, Shijie Wang,* Liping Guo,* Xuepeng Wang, Haixia Liu, Zhenzi Li* and Wei Zhou*



RESEARCH ARTICLES

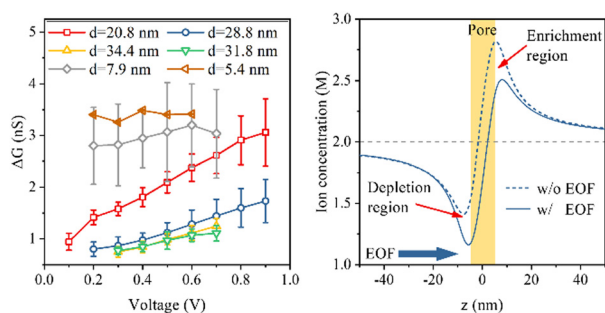
4553



Enabling uniform Li deposition behavior with dynamic electrostatic shield by the single effect of potassium cation additive for dendrite-free lithium metal batteries

Ji Woo Han, Bo Keun Park, Yong Min Kim, Yoonbo Sim, Van-Chuong Ho, Junyoung Mun* and Ki Jae Kim*

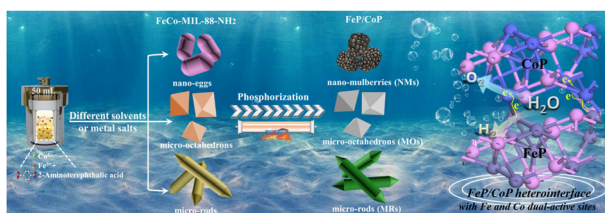
4564



The origin of the voltage dependence of conductance blockades from DNA translocation through solid-state nanopores

Yin Zhang,* Xiang Lian, Wei Si, Jingjie Sha and Yunfei Chen*

4573



Morphology engineering induces the increase of FeP/CoP heterointerface density for efficient alkaline water splitting driven by interfacial dual active sites

Yunmei Du, Lu Zhan, Yanru Liu, Ruixin Chen, Yunlei Fu, Bin Li* and Lei Wang*

