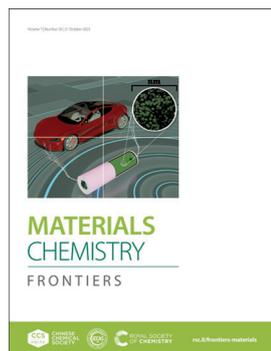


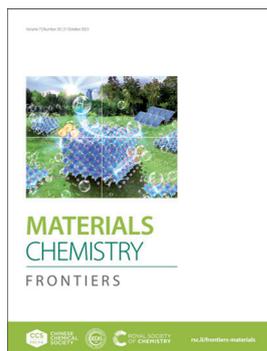
IN THIS ISSUE

ISSN 2052-1537 CODEN MCFAC5 7(20) 4587-5030 (2023)



Cover

See Sang-Jae Kim *et al.*, pp. 4613–4634. Image reproduced by permission of Mr. Raaju Sundhar Arul Saravanan, Mr. Keyru Serbara Bejigo and Prof. Sang-Jae Kim from *Mater. Chem. Front.*, 2023, 7, 4613.



Inside cover

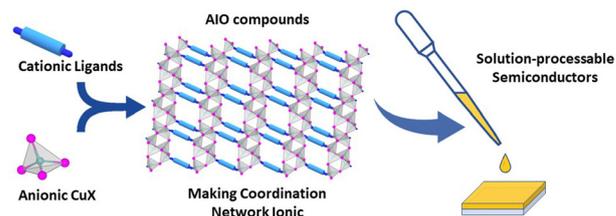
See Shuang Yang, Yu Hou *et al.*, pp. 4635–4657. Image reproduced by permission of Yu Hou from *Mater. Chem. Front.*, 2023, 7, 4635.

FRONTIERS

4598

Making coordination networks ionic: a unique strategy to achieve solution-processable hybrid semiconductors

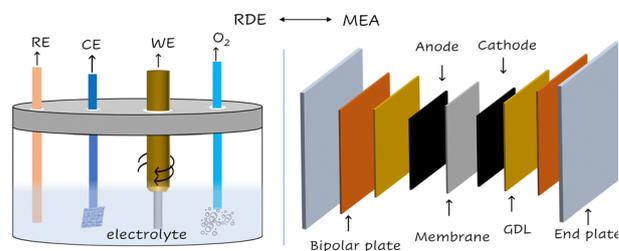
Xiuzhe Hei and Jing Li*



4605

Bridging oxygen reduction performance gaps in half and full cells: challenges and perspectives

Shahid Zaman,* Xinlong Tian* and Bao Yu Xia*



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 should 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. Petrukina, 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
WeiHong 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.

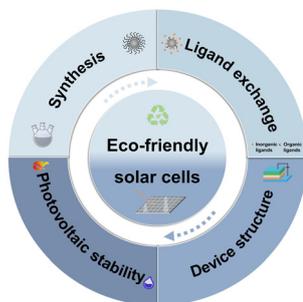
This journal is © the Partner Organisations 2023.

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



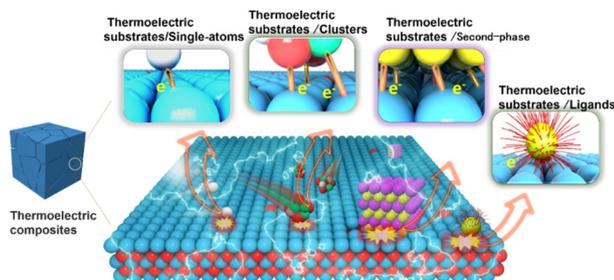
4693



Eco-friendly and ultrathin solar cells featuring nanocrystals: advances and perspectives

Jingjing Wang, Junwei Liu,* Hang Yin, Sunsun Li, Vakhobjon Kuvondikov and Long Ye*

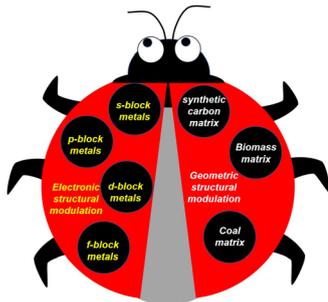
4707



Recent advances in interface engineering of thermoelectric nanomaterials

Xiaoqing Lu, Guilong Pan, Zhan Shi, Biao Xu* and Yue Lou*

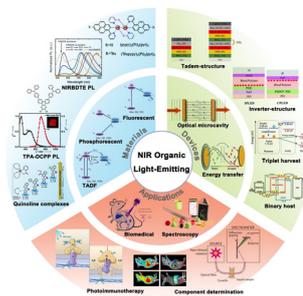
4723



Electronic and geometric modulations of catalysts for electrochemical CO₂ reduction reaction

Shilin Wei, Weiqi Liu,* Chuangchuang Yang, Peiyao Bai, Xiao Kong, Wenbo Sun and Lang Xu*

4744



Near-infrared organic light-emitting materials, devices and applications

Mengxin Xu, Xinyi Li, Shihao Liu, Letian Zhang* and Wenfa Xie*

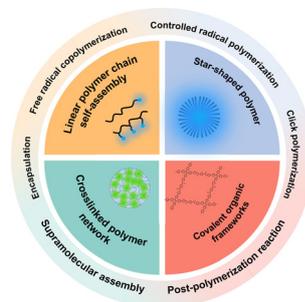


REVIEWS

4768

Polymeric nanomaterials with aggregation-induced emission characteristics

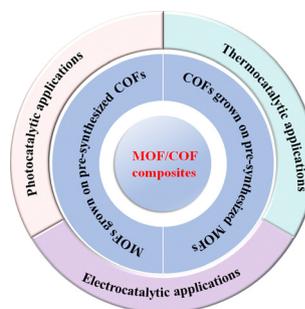
Feng Gao, Weichen Wei, Yanning Xu, Zheng Zhao, Zijie Qiu* and Ben Zhong Tang*



4782

Recent advances in the synthesis and catalytic applications of metal–organic framework/covalent organic framework composites

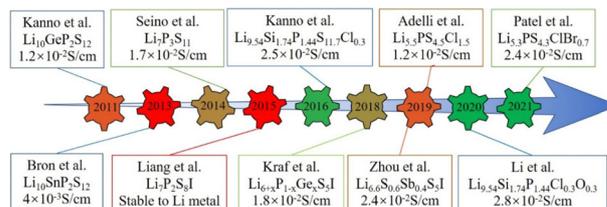
Yanyan Zhang, Guilong Lu, Danfeng Zhao and Xiubing Huang*



4810

Insights into interfacial physiochemistry in sulfide solid-state batteries: a review

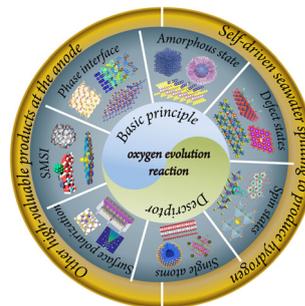
Jianhui Zheng, Xinxin Zhu, Liguang Wang,* Jun Lu and Tianpin Wu*



4833

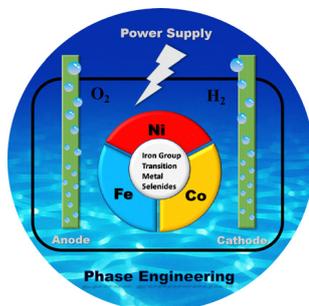
Electrocatalysts for the oxygen evolution reaction: mechanism, innovative strategies, and beyond

Ning Wen, Xiuling Jiao, Yuguo Xia* and Dairong Chen*



REVIEWS

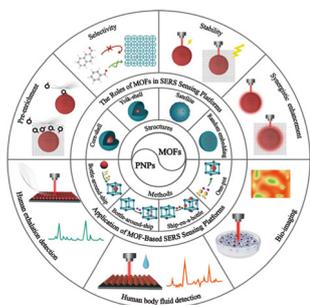
4865



Phase engineering of iron group transition metal selenides for water splitting

Wenwen Cao, Qi Shen, Dandan Men, Bo Ouyang,*
Yiqiang Sun* and Kun Xu*

4880



Metal–organic framework-based SERS sensing platforms for life and health detection

Lindong Ma, Meihui Liu, Xinyuan Zhou, Cancan Li and Tie Wang*

RESEARCH ARTICLES

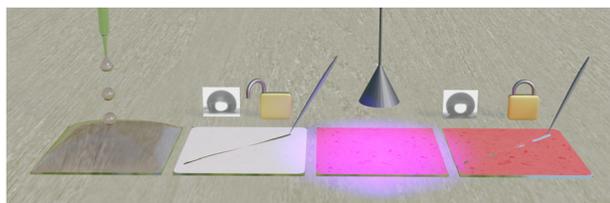
4900



Ultrafine iridium nanoparticles prepared without a surfactant for the acidic oxygen evolution reaction

Anyang Chen, Mengting Deng, Zhiyi Lu, Yichao Lin* and Liang Chen*

4908



Photostabilisation of an omniphobic, drop-castable surface coating by transformation of a self-assembled supramolecular xerogel into a covalent polymer xerogel

Janos Wasternack, Tom White, Sebastian Müller and Christoph A. Schalley*

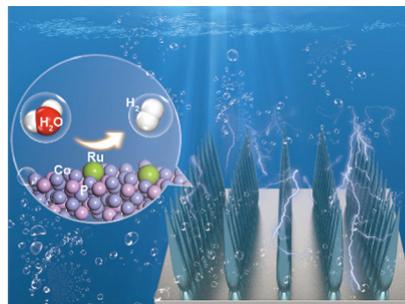


RESEARCH ARTICLES

4918

Optimizing strong metal–support interaction on cobalt phosphide-supported Ru single atom catalyst for highly-efficient hydrogen evolution reaction

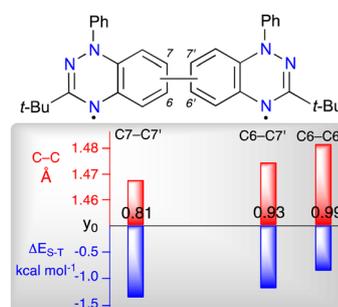
Meng Wu, Rui Zhang,* Chen Li, Xue Sun, Guanjie Chen, Lidan Guo, Kun Zheng and Xiangnan Sun*



4928

Bi-Blatter diradicals: convenient access to regioisomers with tunable electronic and magnetic properties

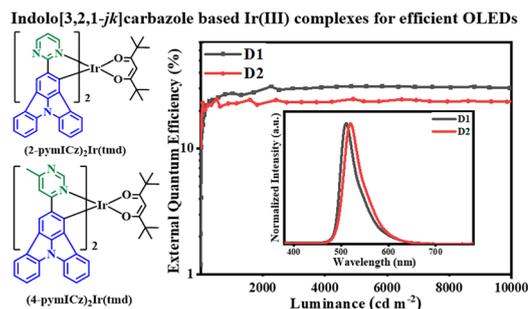
Dominika Pomikto, Anna Pietrzak, Ryohei Kishi and Piotr Kaszyński*



4944

Efficient narrow green organic light-emitting diodes with low efficiency roll-offs based on iridium(III) complexes containing indolo[3,2,1-jk]carbazole and pyrimidine units

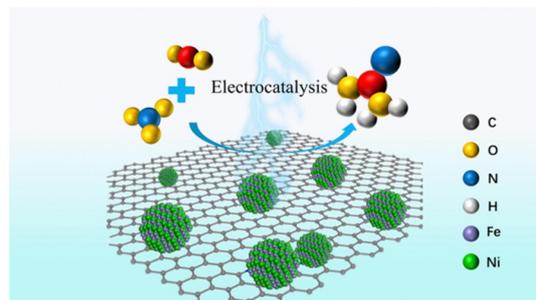
Qi-Ming Liu, Li Yuan, Xiang-Ji Liao, Xiao-Sheng Zhong, Hua-Xiu Ni, Yu Wang, Yue Zhao* and You-Xuan Zheng*



4952

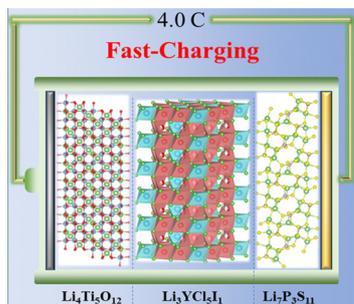
FeNi₃ nanoparticles for electrocatalytic synthesis of urea from carbon dioxide and nitrate

Tong Hou, Junyang Ding,* Hao Zhang, Shanshan Chen, Qian Liu, Jun Luo and Xijun Liu*

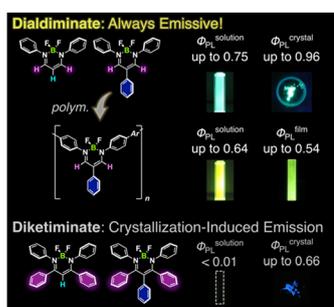


RESEARCH ARTICLES

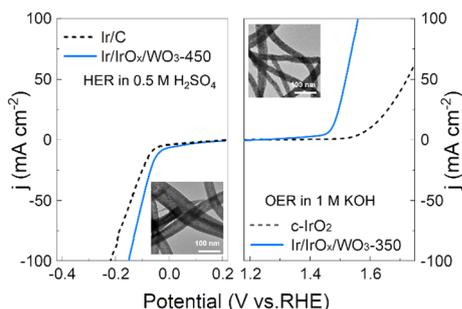
4961

**Fast-charging batteries based on dual-halogen solid-state electrolytes**Hongtu Zhang, Xiaomeng Shi, Zhichao Zeng,*
Yabin Zhang and Yaping Du*

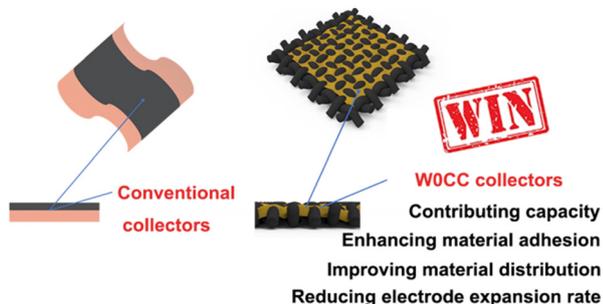
4971

**Highly efficient luminescence from boron β -dialdiminates and their π -conjugated polymers in both solutions and solids: significant impact of the substituent position on luminescence behavior**Shunichiro Ito, Miyako Hashizume, Hideo Taka,
Hiroshi Kita, Kazuo Tanaka* and Yoshiki Chujo

4984

**Ir/IrO_x/WO₃ electrocatalysts for water splitting**Xiaohe Tan, Wangyan Gou, Linqing Liao, Yuanyuan Ma*
and Yongquan Qu*

4993

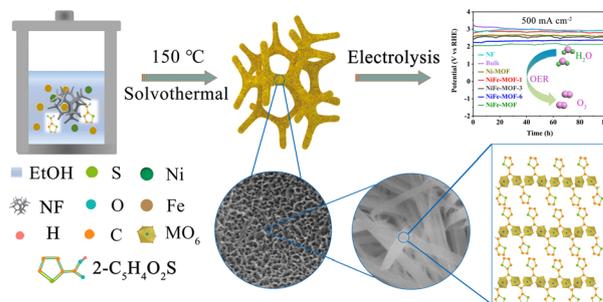
**Boosting the overall specific capacity of SiO electrodes for lithium-ion batteries using a multifunctional carbon cloth current collector**Hao Chen,* Jiajie Wang, Ziheng Guan, Yingjie Tao,
Lanze Li, Junjie Wei, Shijie Ma, Zhilin Yan, Jing Han,
Fan Wang,* Zhehong Shen and Deren Yang

RESEARCH ARTICLES

5005

Porous yet densely packed metal–organic frameworks (MOFs) toward ultrastable oxygen evolution at practical current densities

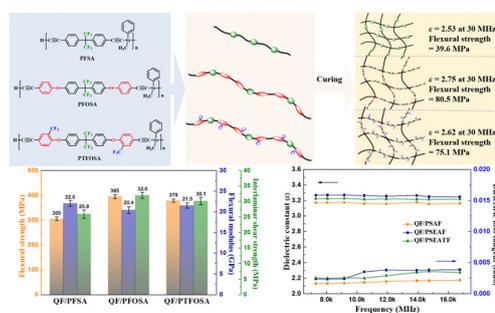
Haiming Wang, Ming Li, Jingjing Duan and Sheng Chen*



5015

Poly(silylene arylacetylene)s containing hexafluoroisopropylidene with attractive mechanical properties and dielectric performance for wave-transparent composites

Changjun Gong, Xiaohan Huang, Shuaikang Lv, Jixian Li, Junkun Tang and Farong Huang*



CORRECTION

5028

Correction: Forming a composite electron blocking layer to enhance the performance of carbon-based CsPbI₃ perovskite solar cells

Yongfa Song, Weiping Li,* Hailiang Wang, Huicong Liu, Yue Deng, Qixian Zhang, Han Rao, Xiaoyu Jiang* and Haining Chen*

