

Sustainable Energy & Fuels

Interdisciplinary research for the development of sustainable energy technologies

rsc.li/sustainable-energy

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 2398-4902 CODEN SEFUA7 7(13) 2945–3154 (2023)



Cover

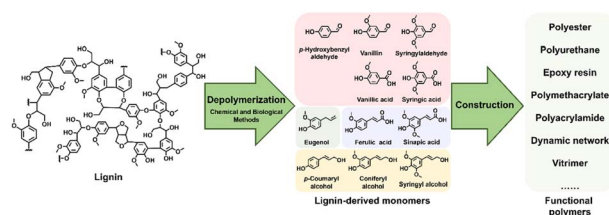
See Zhenyu Tian, Kai Zhao et al., pp. 2997–3013.
Image reproduced by permission of Yong Hao from *Sustainable Energy Fuels*, 2023, 7, 2997.

REVIEW

2953

Strategies for lignin depolymerization and reconstruction towards functional polymers

Lu Jiang,* Chen-Gang Wang, Pei Lin Chee, Chenyang Qu, Alejandro Zikin Fok, Fu Hsien Yong, Zhi Lin Ong and Dan Kai*

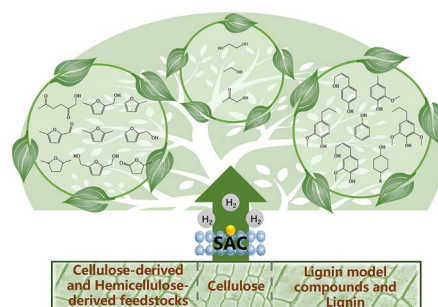


PERSPECTIVE

2974

Selective hydrogenation of lignocellulosic biomass over single-atom catalysts

Xuewei Wang, Bin Zhang and Xi Chen*



Editorial Staff

Executive Editor

Neil Scriven

Deputy Editor

Sarah Holmes

Development Editor

Lily Newton

Editorial Production Manager

Claire Darby

Publisher

Sam Keltie

Publishing Editors

Emma Carlisle, Hannah Hamilton, Ephraim Otumudia, Irene Sanchez Molina Santos, Michael Spenceley, Callum Woof, Lauren Yarrow-Wright

Editorial Assistant

Kate Bando

Publishing Assistant

Linda Warncke

For queries about submitted articles, please contact Claire Darby, Editorial Production Manager, in the first instance. E-mail sustainableenergy@rsc.org

For pre-submission queries, please contact Neil Scriven, Executive Editor.

E-mail sustainableenergy-rsc@rsc.org

Sustainable Energy & Fuels (electronic: ISSN 2398-4902) is published 24 times per year by the Royal Society of Chemistry,

Thomas Graham House, Science Park, Milton Road, Cambridge, CB4 0WF, UK.

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

2023 Annual (electronic) subscription price: £3218; US\$5447. 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

Sustainable Energy & Fuels

rsc.li/sustainable-energy

Sustainable Energy & Fuels publishes high quality scientific research that will drive development of sustainable energy technologies, with a particular emphasis on innovative concepts and approaches.

Editorial Board

Editor-in-Chief

Garry Rumbles, National Renewable Energy Laboratory and University of Colorado Boulder, USA

Associate Editors

Ryu Abe, Kyoto University, Japan
Francesca Brunetti, University of Rome Tor Vergata, Italy
David Mitlin, The University of Texas at Austin, USA

Marta Sevilla, Instituto Nacional del Carbón - CSIC, Spain
Carsten Streb, Johannes Gutenberg University Mainz, Germany
Xinchen Wang, Fuzhou University, China
Karen Wilson, Griffith University, Australia

Advisory Board

Jessica Allen, University of Newcastle, Australia
Vincent Artero, Université Grenoble Alpes, CNRS, CEA, France
Chunmei Ban, University of Colorado, USA
Christoph Brabec, University of Erlangen-Nuremberg, Germany
Jaephil Cho, Ulsan National Institute of Science and Technology (UNIST), South Korea
Cyrille Costentin, Université Grenoble Alpes, France
Seth Darling, Argonne National Laboratory, USA
Benjamin Dietzek, Jena Institute of Photonics, Germany
Gordana Dukovic, University of Colorado Boulder, USA
James Durrant, Imperial College London and Swansea University, UK
Heinz Frei, Lawrence Berkeley National Laboratory, USA
Elizabeth Gibson, University of Newcastle, UK
Susan Habas, National Renewable Energy Laboratory, USA
Anders Hagfeldt, Uppsala University, Sweden
Justin Hodgkiss, Victoria University of Wellington, New Zealand
Osamu Ishitani, Tokyo Institute of Technology,

Japan
Anne Jones, Arizona State University, USA
Kisuk Kang, Seoul National University, South Korea
Frédéric Laquai, KAUST, Saudi Arabia
Lieke Laurens, National Renewable Energy Laboratory, USA
Xianfeng Li, Dalian Institute of Chemical Physics, China
Doug MacFarlane, Monash University, Australia
Chris McNeill, Monash University, Australia
Shirley Meng, University of Chicago, USA
Johannes Messinger, Uppsala University, Sweden
Robert Mokaya, University of Nottingham, UK
Annamma Odaneth, Institute of Chemical Technology, India
Satishchandra Ogale, Indian Institute of Science Education and Research, Pune, India
Jude Onwudili, Aston University, UK
Martin Oschatz, Friedrich-Schiller-University Jena, Germany
Emilio Palomares, Catalan Institute of Chemical Research, Spain
Xiulan Pan, Dalian Institute of Chemical Physics, China

Alissa Park, Columbia University, USA
Nam-Gyu Park, Sungkyunkwan University, South Korea
Volker Presser, Leibniz Institute for New Materials, Germany
Amy Prieto, Colorado State University, USA
Liangti Qu, Tsinghua University, China
Erin Ratcliff, University of Arizona, USA
Srinivasan Sampath, Indian Institute of Science, India
Kimberley See, California Institute of Technology, USA
Uwe Schroder, TU-Braunschweig, Germany
Wendy Shaw, Pacific Northwest National Laboratory, USA
Adalgisa Sinicropi, University of Siena, Italy
Junwang Tang, University College London, UK
Roel van de Krol, Helmholtz-Zentrum Berlin für Materialien und Energie, Germany
Koen Vandewal, Dresden University of Technology, Germany
Aron Walsh, Imperial College London, UK
Aiqin Wang, Dalian Institute of Chemical Physics, China
Michael Wasielewski, Northwestern University, USA
Yan Yao, University of Houston, USA

Information for Authors

Full details on how to submit material for publication in Sustainable Energy & Fuels 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/sustainable-energy

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

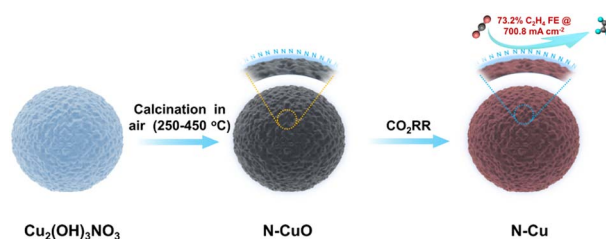


COMMUNICATION

2991

Surface N-coordinated Cu catalysts for CO₂ electroreduction to ethylene at industry-level current densities

Huanhuan Tao, Fang Wang, Zhengguo Zhang and Shixiong Min*

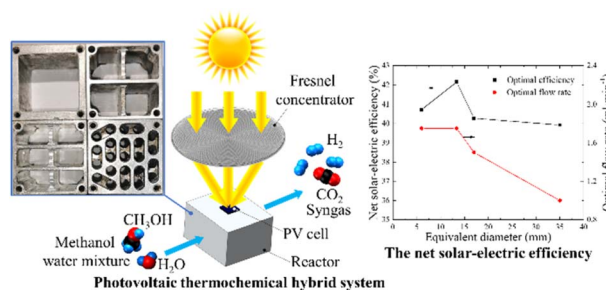


PAPERS

2997

Methanol steam reforming reactor design for efficient photovoltaic–thermochemical power generation

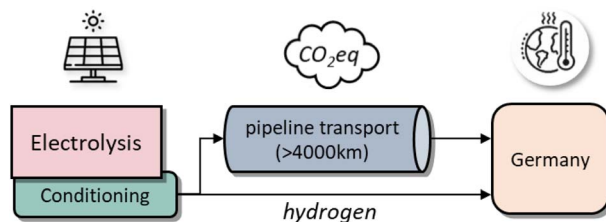
Zhenyu Tian, Kai Zhao, Yidian Zhang, Lingzhi Yang, Yu Shao and Yong Hao*



3014

Life-cycle global warming impact of hydrogen transport through pipelines from Africa to Germany

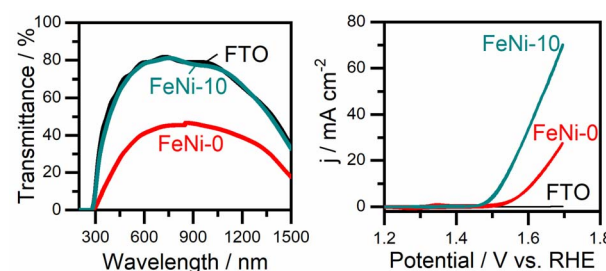
Olga Kanz,* Franka Brüggemann, Kaining Ding, Karsten Bittkau, Uwe Rau and Angèle Reinders



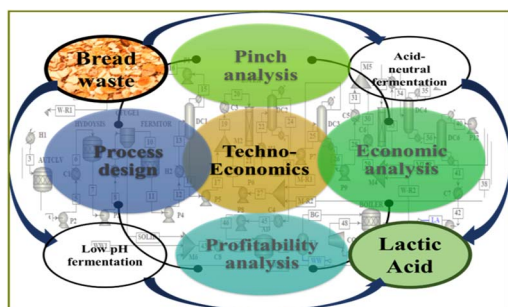
3025

A transparent iron-incorporated nickel hydroxide electrocatalyst for efficient water oxidation

Amira Y. Ahmed, Dattatray S. Dhawale* and Tarek A. Kandiel*



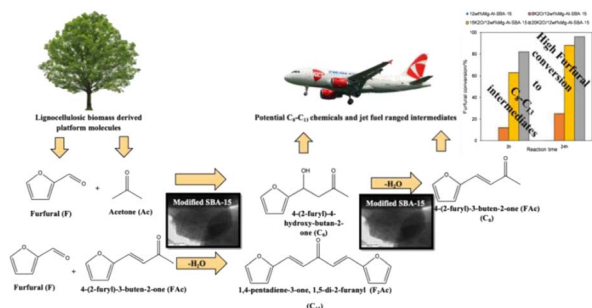
3034



Lactic acid and biomethane production from bread waste: a techno-economic and profitability analysis using pinch technology

Swarnalatha Mailaram, Vivek Narisetty, Sunil K. Maity,*
Siddharth Gadkari, Vijay Kumar Thakur, Stephen Russell
and Vinod Kumar*

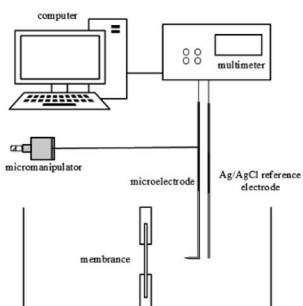
3047



Potassium-modified bifunctional MgAl-SBA-15 for aldol condensation of furfural and acetone

Mahashanon Arumugam,* Oleg Kikhtyanin,
Amin Osatiashtiani, Veronika Kyselová, Vlastimil Fila,
Iva Paterova, Ka-Lun Wong and David Kubička*

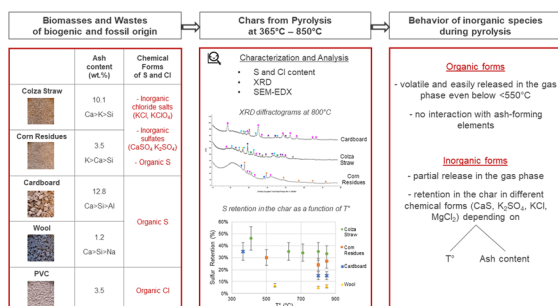
3060



Direct measurement of boundary layer thickness on ion-exchange membrane surfaces during reverse electrodialysis

Mei Li, Zheyu Xiang,* Jiabin Guo, Nianchun Zhang,
Hongbo Zheng, Xiaoliang Li and Yanmeng Hao

3067



Characterization of sulfur and chlorine behavior during pyrolysis of biomass and waste

Hala Braidry, Sylvie Valin* and Fabrice Patisson

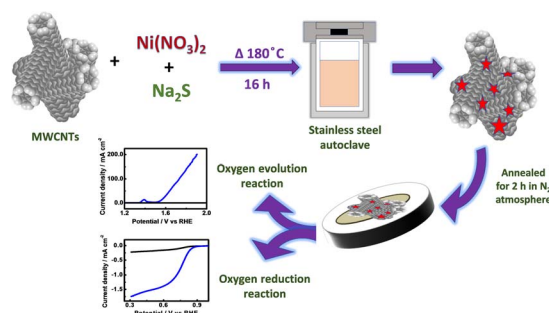


PAPERS

3077

Template-free hydrothermal synthesis of nickel sulfide nanocrystals on MWCNTs: efficient and stable bifunctional electroactive material for oxygen electrocatalysis

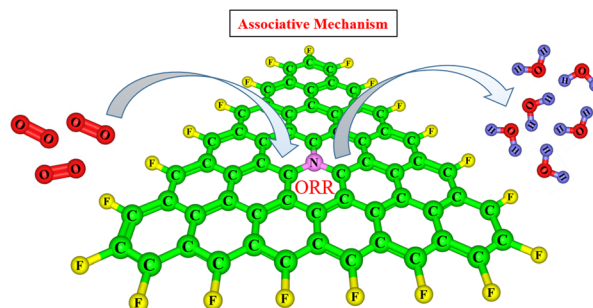
Mamta Yadav, Devesh Kumar Singh and Vellaichamy Ganesan*



3088

DFT study on a fluorine-functionalized nitrogen- and boron-doped triangulene as an electrocatalyst for the oxygen reduction reaction

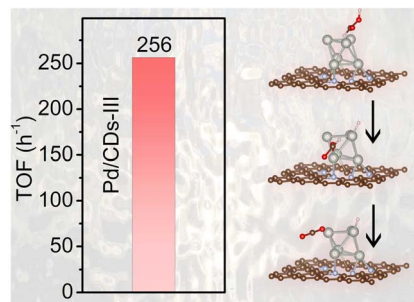
Thangaraj Thiruppathiraja, Pugal Neelam Parameswaran Senthana and Senthilkumar Lakshmipathi*



3096

Self-crosslinked N-doped carbon dot supported Pd as an efficient catalyst for dehydrogenation of formic acid at room temperature

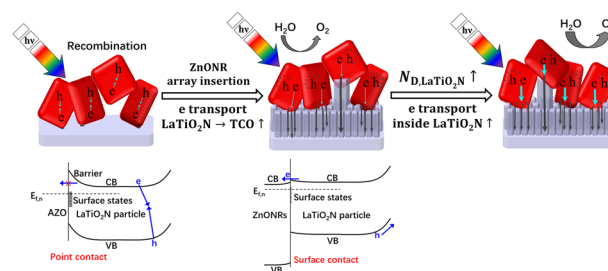
Zhongxuan Lin, Ouyang Liu, Shuyan Guan, Xinru Zhao, Zhenluo Yuan, Xianyun Liu,* Linyan Bian, Yanping Fan, Qiuming Peng, Shumin Han and Baozhong Liu*



3106

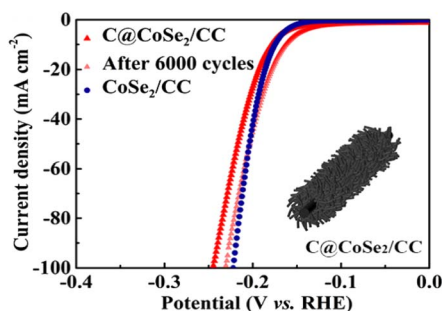
Enhanced electron collection in a particulate LaTiO₂N photoanode assembled with an inserted ZnO nanorod array for photoelectrochemical water oxidation

Xiaoli Liu, Hezhou Huang, Xin Luo, Jianqiang Luo, Shujuan Liu, Yangbo Zhong, Yifan Zhang, Jiaojiao Ma and Feng-Qiang Xiong*



PAPERS

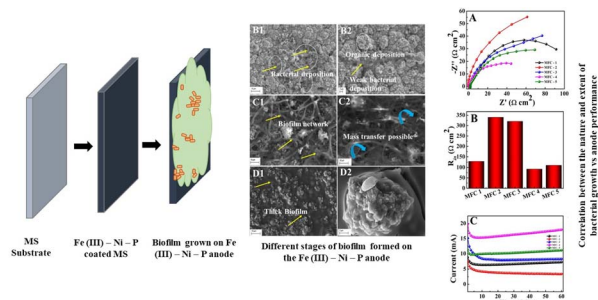
3116



Carbon layer-protected self-supporting CoSe₂ nanowire arrays for durable hydrogen evolution reaction catalysts

Xinyue Wang, Yibin Wang, Xinzhi Ma,^{*} Lingling Xu, Sirui Liu, Wei Wang, Huiqing Lu^{*} and Lili Wu

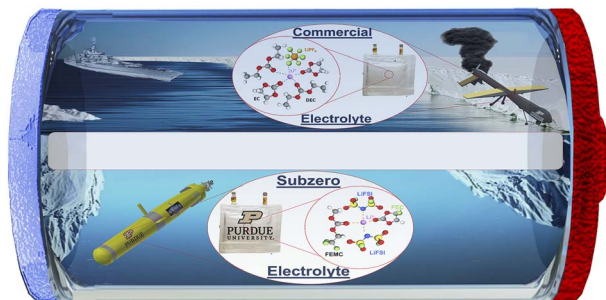
3122



Strategic regulation of barrier characteristics of biofilms to enhance the extracellular electrogenic performance in MFCs: an electrochemical dynamic evaluation study

Ramakrishnan Gomathi Remya, Bhuvanendran Revamma Sreelekshmy, Babu Indira Bijimol, Anjana Ratheesh and Sheik Muhammadhu Aboobakar Shibli^{*}

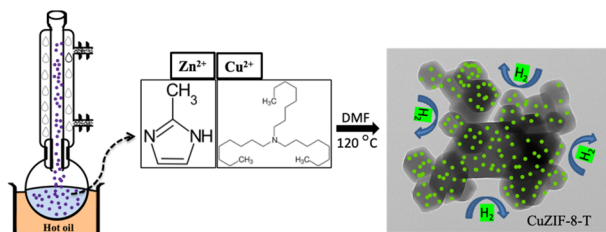
3134



Novel ternary fluorinated electrolyte's enhanced interfacial kinetics enables ultra-low temperature performance of lithium-ion batteries

Ethan Adams, Mihit Parekh, Daniel Gribble, Thomas Adams and Vilas G. Pol^{*}

3142



Room temperature hydrogen storage enhancement in copper-doped zeolitic imidazolate frameworks with trioctylamine

Syedvali Pinjari, Tapan Bera and Erik Kjeang^{*}

