Sustainable Energy & Fuels

Interdisciplinary research for the development of sustainable energy technologies

rsc.li/sustainable-energy

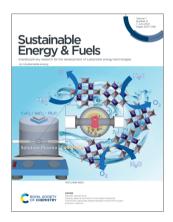
The Royal Society of Chemistry is the world's leading chemistry community. Through our high impact journals and publications we connect the world with the chemical sciences and invest the profits back into the chemistry community.

IN THIS ISSUE

ISSN 2398-4902 CODEN SEFUA7 7(11) 2507-2766 (2023)



Cover See Rakesh K. Sharma et al., pp. 2568–2581. Image reproduced by permission of Rakesh K. Sharma from Sustainable Energy Fuels, 2023, 7, 2568.



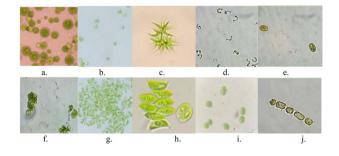
Inside cover See Takahiro Ishizaki et al., pp. 2582–2593. Image reproduced by permission of Takahiro Ishizaki from Sustainable Energy Fuels, 2023, 7, 2582.

REVIEWS

2515

Algae as a source of renewable energy: opportunities, challenges, and recent developments

Javid Hussain* and Bruce E. Rittmann



2545

Photoelectrochemical and electrochemical CO₂ reduction to formate on post-transition metal block-based catalysts

Qixing Zhang, Zhongke Wang, Han He, Juan Wang, Ying Zhao* and Xiaodan Zhang*



Editorial Staff

Executive Editor

Neil Scriven

Deputy Editor

Sarah Holmes

Development Editor

Lily Newton

Editorial Production Manager

Claire Darby

Publisher

Emma Carlisle, Hannah Hamilton, Irene Sanchez Molina Santos, Michael Spencelayh, Callum Woof, Lauren Yarrow

Editorial Assistant

Kate Bandoo

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

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,

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 W1I 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 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 Japan 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,

Seth Darling, Argonne National Laboratory,

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, Physics, China

Anne Jones, Arizona State University, USA Kisuk Kang, Seoul National University, South

Frédéric Laquai, KAUST, Saudi Arabia Lieve 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,

Robert Mokaya, University of Nottingham, UK Annamma Odaneth, Institute of Chemical Technology, India

Satishchandra Ogale, Indian Institute of Science Education and Research, Pune, India Iude Onwudili, Aston University, UK Martin Oschatz, Friedrich-Schiller-University Jena, Germany

Emilio Palomares, Catalan Institute of Chemical Research, Spain Xiulian Pan, Dalian Institute of Chemical

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,

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.

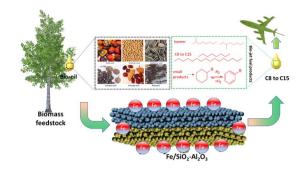
This journal is © The Royal Society of Chemistry 2023. Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication 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



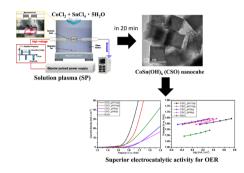
Highly selective production of bio-jet fuel grade alkanes over an Fe/SiO2-Al2O3 solid acid catalyst under solvent-free conditions

Bhagirath Saini, Meena Yadav, Shubham Kumar Jha, R. Krishnapriya, Preeti Kang, Vishav Kant, Rahul Singhal and Rakesh K. Sharma*



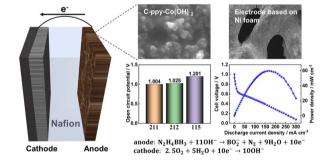
Solution plasma synthesis of perovskite hydroxide CoSn(OH)₆ nanocube electrocatalysts toward the oxygen evolution reaction

Masaki Narahara, So Yoon Lee, Kodai Sasaki, Kaito Fukushima, Kenichi Tanaka, Sangwoo Chae, Xiulan Hu, Gasidit Panomsuwan and Takahiro Ishizaki*



Direct hydrazine borane fuel cells using non-noble carbon-supported polypyrrole cobalt hydroxide as an anode catalyst

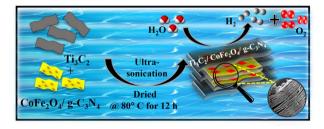
Yang Zhang, Gang Zhu, Zhenying Chen, Yingying Liu, Donghao Ye, Ao Wang, Wenxing Jiang, Chengwei Deng, Xiaodong Zhuang, Junliang Zhang and Changchun Ke*

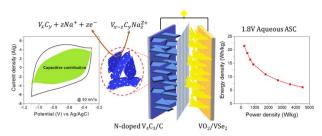


2601

CoFe₂O₄/g-C₃N₄ intercalated Ti₃C₂ MXene for efficient electrocatalytic hydrogen evolution reaction

Sandra Mathew, Madhushree R. and Sunaja Devi K. R.*





Understanding supercapacitive performance of a Ndoped vanadium carbide/carbon composite as an anode material in an all pseudocapacitive asymmetric cell

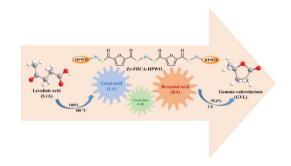
Hem Kanwar Rathore, Muruganandham Hariram, Mukhesh K. Ganesha, Ashutosh K. Singh, Debanjan Das, Manoj Kumar, Kamlendra Awasthi and Debasish Sarkar*

2627



Zinc-ion hybrid supercapacitor-batteries with a leaflike ZIF-L/MgNiO₂ micro-sphere composite and a Zn²⁺/sulfonated poly(ether ether ketone) gel

Ishita Naskar, Partha Ghosal and Melepurath Deepa*



Catalytic transfer hydrogenation of levulinic acid to gamma-valerolactone over a zirconium-based FDCA hybrid: insights into the effect of heteropoly acids

Rulu Huang, Yuan Cheng, Huai Liu,* Lincai Peng and Junhua Zhang*



Technical, economic, and environmental potential of glycerol hydrogenolysis: a roadmap towards sustainable green chemistry future

Adrian Chun Minh Loy, Wei Lin Ng, Shanthi Priya Samudrala and Sankar Bhattacharya*

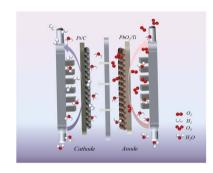
Desalting biocrude for improved downstream processing toward marine fuel application

Uriah Kilgore, Daniel M. Santosa, Shuyun Li, Peipei Wang, Suh-Jane Lee, Michael R. Thorson and Karthikeyan Ramasamy*



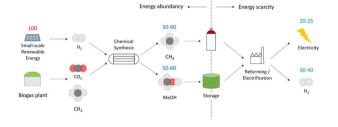
A long-term-stable continuous flow electrochemical ozone generator with high current efficiency

Xi Wang, Dandan Wu and Xu Wu*



Techno-economic-environmental assessment of the integration of power-to-X and biogas utilization towards the production of electricity, hydrogen, methane and methanol

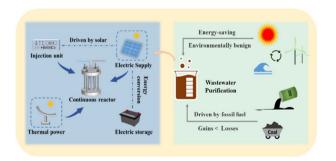
Emanuele Moioli* and Tilman Schildhauer



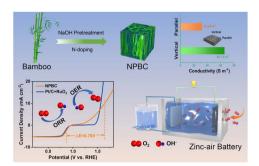
2707

A rational strategy for substantially enhancing the solar-utilization efficiency and organic-pollutantdegradation rate via mediated central processing unit filling

Nana Li, Baohui Wang, * Meng Wang, Lei Tao, Chaoying Li, Zhiqiang Qiao, Di Gu, Lingyue Zhu, Dandan Yuan, Hongjun Wu and Xirui Wang*



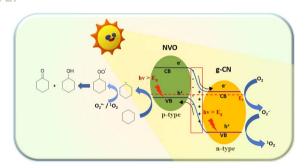
2717



Bamboo derived N-doped carbon as a bifunctional electrode for high-performance zinc-air batteries

Peng Cui, Tingzhen Li, Xiao Chi, Wu Yang, Zehong Chen, Wenjia Han, Ruidong Xia, Admassie Shimelis, Emmanuel Iheanvichukwu Iwuoha and Xinwen Peng*

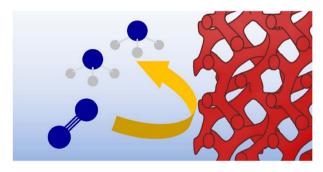
2727



A Ni₃V₂O₈@g-CN nanocomposite-based p-n heterojunction: mechanistic insights into photocatalytic activation of the inert C(sp3)-H bond

Anjali Verma, Arpna Jaryal, Deepak Kumar Chauhan, Venugopala Rao Battula, Madhurima Sarkar, Abhijit Patra and Kamalakannan Kailasam*

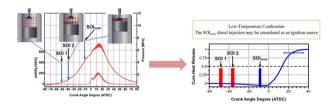
2740



Electrochemical nitrogen reduction to ammonia using mesoporous iron oxide with abundant oxygen vacancies

Toshihiro Takashima,* Takumi Mochida and Hiroshi Irie

2749



Statistical analysis of ethanol/diesel dual-fuel combustion of compression ignition engines in RCCI mode using multi-injection strategies

Ahmed Mohammed Elbanna, Xiaobei Cheng,* Can Yang, Medhat Elkelawy, Hagar Alm-Eldin Bastawissi and Haocheng Xu