

EES Catalysis

rsc.li/eescatalysis

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

eISSN 2753–801X CODEN ECEACE 1(4) 325–582 (2023)



Cover

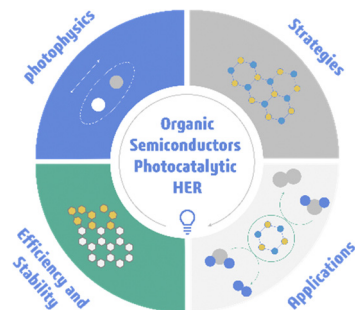
See Wenzhen Li, Shuang Gu *et al.*, pp. 504–515. Image reproduced by permission of Wenzhen Li and Shuang Gu from *EES Catal.*, 2023, 1, 504.

REVIEWS

333

Advances in organic semiconductors for photocatalytic hydrogen evolution reaction

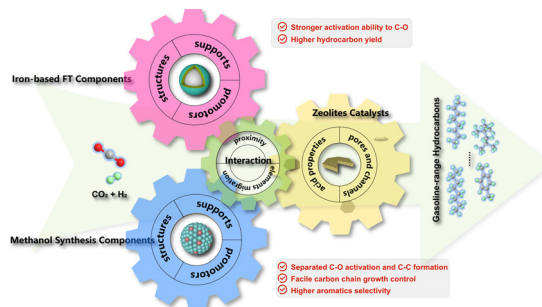
Yan Guo, Qixin Zhou, Bowen Zhu, Chuyang Y. Tang* and Yongfa Zhu*



353

A review of the recent progress on direct heterogeneous catalytic CO₂ hydrogenation to gasoline-range hydrocarbons

Xin Shang, Guodong Liu, Xiong Su,* Yanqiang Huang* and Tao Zhang



Editorial Staff**Executive Editor**

Emma Eley

Deputy Editor

Jon Ferrier

Editorial Production Manager

Sarah Whitbread

Assistant Editors

Jamie Purcell, Aphra Murray, Alexander John, Emily Ellison, Jack Pitchers

Editorial Assistant

Alex Holiday

Publishing Assistant

Lee Colwill

Publisher

Neil Hammond

For queries about submitted papers, please contact Sarah Whitbread, Editorial Production Manager in the first instance. E-mail: EESCatalysisRSC@rsc.org

For pre-submission queries please contact

Emma Eley, Executive Editor.

E-mail: EESCatalysis-RSC@rsc.org

EES Catalysis (electronic: ISSN 2753-801X) is published 6 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

EES Catalysis 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

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

EES Catalysis

rsc.li/EESCatalysis

EES Catalysis publishes exceptional research on energy and environmental catalysis.

Editorial Board**Editor-in-Chief**

Shizhang Qiao, The University of Adelaide, Australia

Associate Editors

Honggang Fu, Heilongjiang University, China
Susan Habas, National Renewable Energy Laboratory, USA
Zhichuan Xu, Nanyang Technological University, Singapore
Rebecca Melen, Cardiff University, UK

Advisory Board

Joel W. Ager III, Lawrence Berkeley National Laboratory, USA

Alexis Bell, University of California, Berkeley, USA

Annemie Bogaerts, University of Antwerp, Belgium

Charles T. Campbell, University of Washington, USA

Jingguang Chen, Columbia University, USA

Zhongwei Chen, University of Waterloo, Canada

Ib Chorkendorff, Technical University of Denmark, Denmark

Charles Dismukes, Rutgers University, USA

Shaojun Guo, Peking University, China

Qian He, National University of Singapore, Singapore

Ungyu Paik, Hanyang University, Korea

Menny Shalom, Ben-Gurion University of the Negev, Israel

Licheng Sun, KTH Royal Institute of Technology, Sweden

Zhiyong Tang, National Center for Nanoscience and Technology, China

David Tilley, University of Zurich, Switzerland

Ye Wang, Xiamen University, China

Information for Authors

Full details on how to submit material for publication in EES Catalysis 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/EESCatalysis

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.

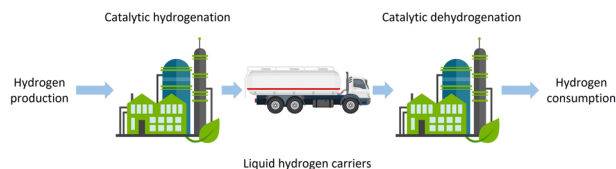
This journal is © The Royal Society of Chemistry 2023. Apart from fair dealing for the purposes of research or private study for non-commercial purposes, or criticism or review, as permitted under the Copyright, Designs and Patents Act 1988 and the Copyright and Related Rights Regulation 2003, this publication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



REVIEWS

459

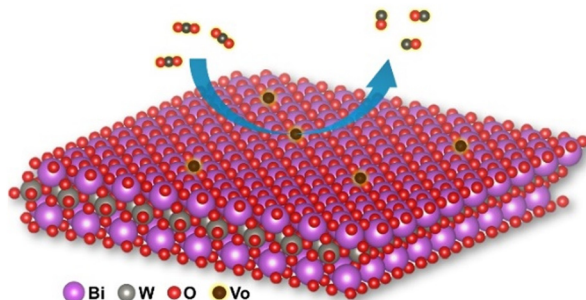


Catalytic hydrogen storage in liquid hydrogen carriers

Yuwen Ni, Zhe Han,* Yuchao Chai, Guangjun Wu and Landong Li*

COMMUNICATION

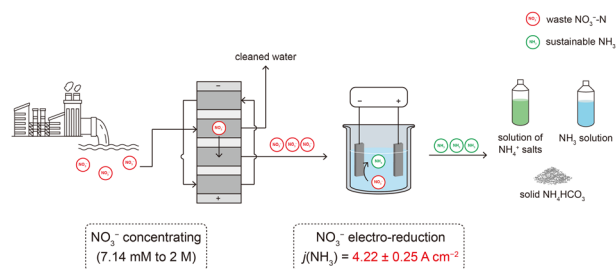
495

*In situ* solvothermal reduction engineering enables delicate control over surface-rich oxygen vacancies on Bi₂WO₆ for highly efficient photocatalytic CO₂ reduction

Huanhuan Liu, Yanxu Chen, Wentao Wang, Xiaoyue He, Zixu He, Lei Li, Suyuan Zeng, Ruiguo Cao and Genqiang Zhang*

PAPERS

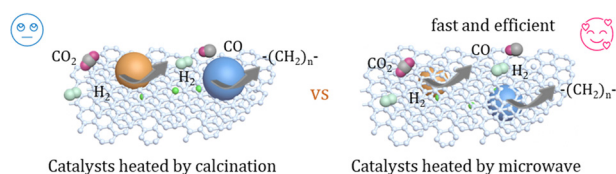
504



Sustainable waste-nitrogen upcycling enabled by low-concentration nitrate electro dialysis and high-performance ammonia electrosynthesis

Yifu Chen, Pouya Ammari-Azar, Hengzhou Liu, Jungkuk Lee, Yu Xi, Michael J. Castellano, Shuang Gu* and Wenzhen Li*

516

Microwave-assisted carbon-confined iron nanoparticles for steering CO₂ hydrogenation to heavy hydrocarbons

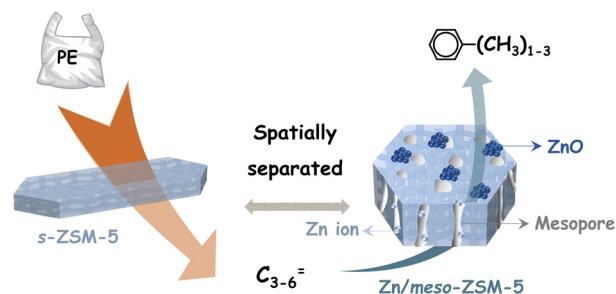
Lisheng Guo,* Peipei Ai, Xinhua Gao, Hao Wu, Xianbiao Wang, Yasuharu Kugue, Jiaming Liang, Weizhe Gao, Xiaoyu Guo, Jian Sun,* Song Sun* and Noritatsu Tsubaki*



529

Selective conversion of polyethylene wastes to methylated aromatics through cascade catalysis

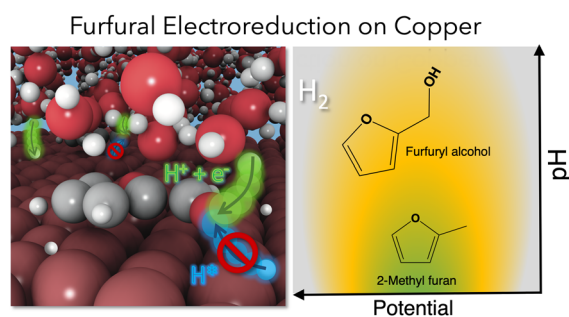
Jindi Duan, Hai Wang, Hangjie Li, Lujie Liu, Kai Fan, Xiangju Meng, Zhiguo Zhang,* Liang Wang* and Feng-Shou Xiao*



539

Unraveling the reaction mechanisms for furfural electroreduction on copper

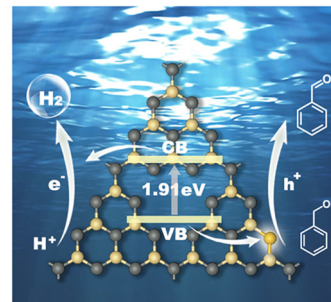
Sihang Liu, Zamaan Mukadam, Soren B. Scott, Saurav Ch. Sarma, Maria-Magdalena Titirici, Karen Chan, Nitish Govindarajan,* Ifan E. L. Stephens* and Georg Kastlunger*



552

Electron-rich pyrimidine rings enabling crystalline carbon nitride for high-efficiency photocatalytic hydrogen evolution coupled with benzyl alcohol selective oxidation

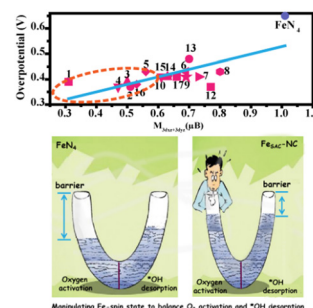
Zhi Lin, Yiqing Wang, Ta Thi Thuy Nga, Jie Zhang, Ruizhe Wang, Zhengqi Zhang, Yufei Xu, Daming Zhao, Chung-Li Dong and Shaohua Shen*

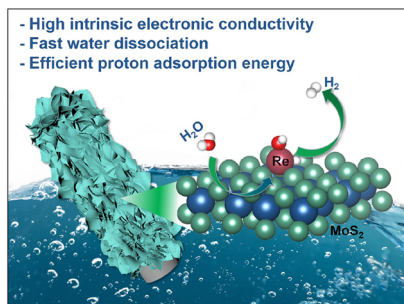


562

Manipulating the spin state to activate the atomically dispersed Fe–N–C catalyst for oxygen reduction

Fan Liu, Chengxiang Shi, Lun Pan, Zhen-Feng Huang,* Xiangwen Zhang and Ji-Jun Zou*





Single-atomic rhenium-assisted 2H-to-1T phase transformation of MoS₂ nanosheets boosting electrocatalytic hydrogen evolution

Jianmin Yu, Yongteng Qian, Qing Wang, Chenliang Su, Hyoyoung Lee,* Lu Shang* and Tierui Zhang*

