

Environmental Science: Advances

rsc.li/esadvances

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 2754-7000 CODEN ESANE8 2(9) 1143–1274 (2023)



Cover

Cover Image credit: © Sean Gladwell/Getty Images.

EDITORIAL

1149

Introduction to artificial intelligence and machine learning in environmental science

Hemi Luan* and Zongwei Cai

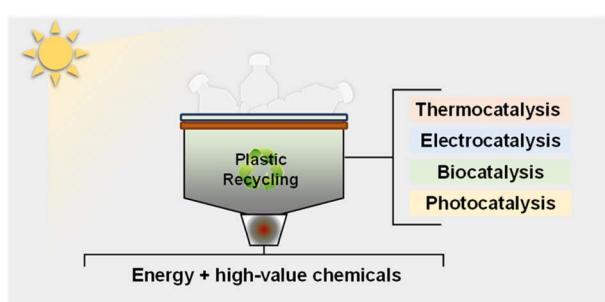


TUTORIAL REVIEW

1151

Advancements in catalysis for plastic resource utilization

Yao Chen, Lele Bai, Dening Peng, Xinru Wang, Meijun Wu and Zhenfeng Bian*



Editorial Staff**Executive Editor**

Emma Eley

Deputy Editor

Jon Ferrier

Editorial Production Manager

Sarah Whitbread

Assistant Editors

Aphra Murray, Jamie Purcell, 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: esadvances@rsc.org

For pre-submission queries please contact

Emma Eley, Executive Editor.

E-mail: esadvances-rsc@rsc.org

Environmental Science: Advances (electronic: ISSN 2754-7000) is published 12 times a year by the Royal Society of Chemistry, Thomas Graham House, Science Park, Milton Road, Cambridge, UK CB4 0WF.

Environmental Science: Advances is a Gold Open Access journal and all articles are free to read.

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

Environmental Science: Advances

rsc.li/esadvances

Uniting disciplines to solve environmental challenges

Editorial Board**Editors-in-Chief**

Zongwei Cai, Hong Kong Baptist University, Hong Kong

Kevin Jones, Lancaster University, UK

Célia M. Manaia, Universidade Católica Portuguesa, Portugal

Associate Editors

Ru-jin Huang, Institute of Earth Environment, Chinese Academy of Sciences, China

Liuw Zhang, Fudan University, China

Pernilla Bohlin-Nizzetto, Norwegian Institute for Air Research, Norway

David Weissbrodt, Norwegian University of Science and Technology, Norway

Members

Silvia Lacorte seult, IDAEA-CSIC, Spain

Advisory Board

Damià Barceló, Institute of Environmental Assessment and Water Research, Spain

Zhi-Feng Chen, Guangdong University of Technology, China

Jiping Chen, Dalian Institute of Chemical Physics, China

Chuncheng Chen, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China

Saikat Dutta, Amity University, India

Maofa Ge, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China

Tom Harner, Environment and Climate Change Canada, Canada

Rong Ji, Nanjing University, China

Ramanan Laxminarayan, One Health Trust, Washington D.C., United States

Yongjie Li, University of Macau, Taipa, Macao

Hemi Luan, Guangdong University of Technology, China

Jurgita Ovadnevaite, National University of Ireland Galway, Ireland

Francois Perreault, University of Quebec at Montreal, Canada

Debora Rodrigues, University of Houston, USA

Andreas Schäffer, Institute for Environmental Research, RWTH Aachen University, Germany

Philippe Schmitt-Kopplin, Helmholtz Zentrum München, Germany

Dörthe Tetzlaff, Humboldt University of Berlin and IGB Leibniz Institute of Freshwater Ecology and Inland Fisheries

Mark van Loosdrecht, Technische Universiteit Delft, Netherlands

Meizhen Wang, Zhejiang Gongshang University, China

Zhe Wang, Hong Kong University of Science and Technology, Hong Kong, China

Dengsong Zhang, Shanghai University, China

Xuan Zhang, University of California, Merced, USA

Information for Authors

Full details on how to submit material for publication in Environmental Science: Advances 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/esadvances

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

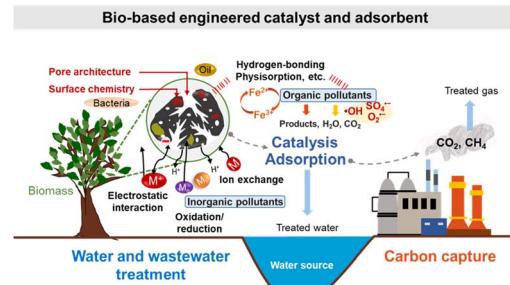


CRITICAL REVIEW

1167

Integrated 3D pore architecture design of bio-based engineered catalysts and adsorbents: preparation, chemical doping, and environmental applications

Dinh Viet Cuong, Jhen-Cih Wu, Eakalak Khan, Gijs Du Laing, Yong Sik Ok* and Chia-Hung Hou*

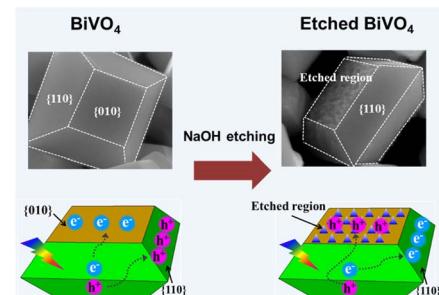


PAPERS

1189

Surface etching to tune the behaviours of photogenerated charges on a decahedron BiVO_4 crystal for efficient photocatalysis

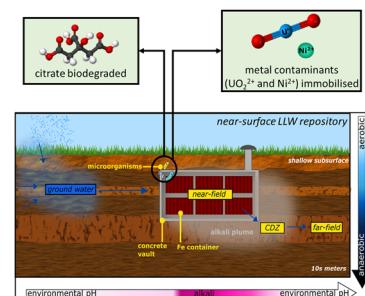
Yue Zhao, Shunning Li, Hui Li, Bin Zeng, Haibo Chi, Yihuan Wang, Huangzhao Wei, Feng Pan* and Rengui Li*



1196

Anaerobic biodegradation of citric acid in the presence of Ni and U at alkaline pH; impact on metal fate and speciation

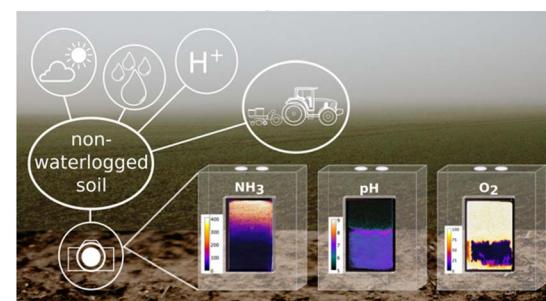
Natalie Byrd,* Jonathan R. Lloyd, Luke T. Townsend, Joe S. Small, Frank Taylor, Heath Bagshaw, Christopher Boothman, Ilya Strashnov and Katherine Morris*



1210

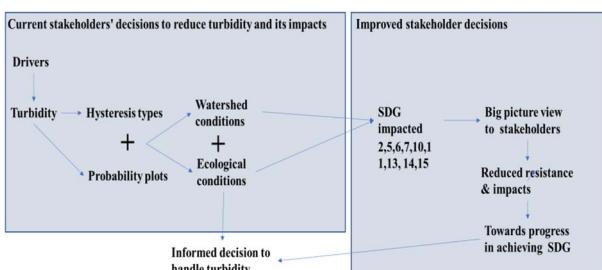
Optical chemical sensors for soil analysis: possibilities and challenges of visualising NH_3 concentrations as well as pH and O_2 microscale heterogeneity

Theresa Merl, Yihuai Hu, Johanna Pedersen, Silvia E. Zieger, Marie Louise Bornø, Azeem Tariq, Sven Gjedde Sommer and Klaus Koren*



PAPERS

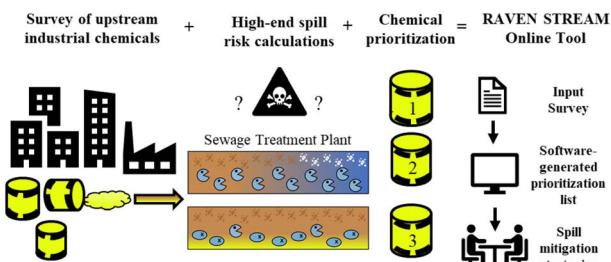
1220



Conceptualizing turbidity for aquatic ecosystems in the context of sustainable development goals

D. Sahoo* and A. Anandhi

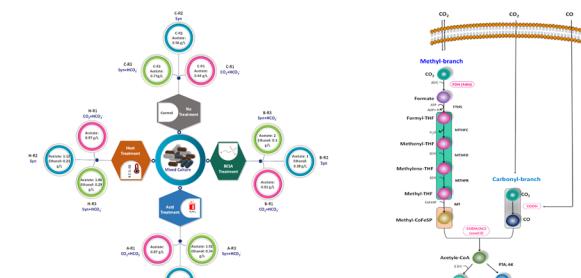
1235



Prioritizing toxic shock threats to sewage treatment plants from down-the-drain industrial chemical spills: the RAVEN STREAM online tool

John D. Hader,* Marcus Frenzel, Jerome Scullin,
Elzbieta Plaza and Matthew MacLeod*

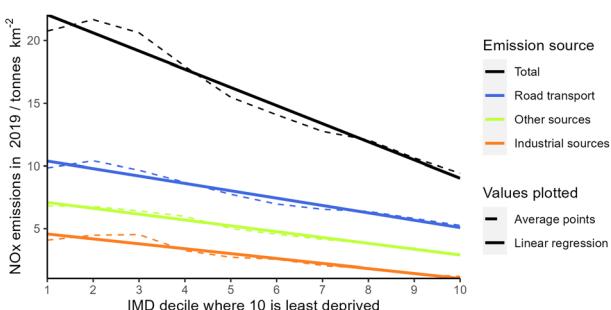
1247



Syngas fermentation to ethanol: CODH/AdhE1 gene expression and microbial community dynamics

Athmakuri Tharak, Ranaprathap Katakojwala and S. Venkata Mohan*

1261



Deprivation based inequality in NO_x emissions in England

Nathan R. Gray, Alastair C. Lewis and Sarah J. Moller*