

Environmental Science Processes & Impacts

rsc.li/espi

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 2050-7887 CODEN ESPICZ 25(12) 1853–2190 (2023)



Cover
See Jörg Feldmann *et al.*, pp. 1926–1936. Image reproduced by permission of Viktoria Müller from *Environ. Sci.: Processes Impacts*, 2023, 25, 1926.



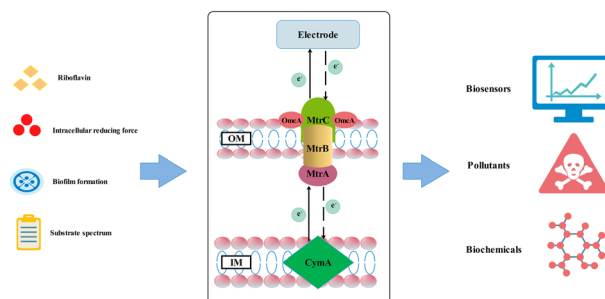
Inside cover
See Zhixin Qi, Deqi Xiong *et al.*, pp. 1937–1944. Image reproduced by permission of Wenxin Li from *Environ. Sci.: Processes Impacts*, 2023, 25, 1937.

CRITICAL REVIEWS

1863

Mechanism and applications of bidirectional extracellular electron transfer of *Shewanella*

Yuxuan Zang, Bo Cao, Hongyu Zhao, Beizhen Xie, Yanhong Ge, Hong Liu* and Yue Yi*



1878

Photochemistry of oil in marine systems: developments since the Deepwater Horizon spill

Mohamed Elsheref, Lena Messina and Matthew A. Tarr*



Editorial Staff

Executive Editor

Neil Scriven

Deputy Editor

Grace Thoburn

Development Editor

Nour Tanbouza

Editorial Production Manager

Claire Darby

Publishing Editors

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

Editorial Assistant

Kate Bando

Publishing Assistant

Linda Warncke

Publisher

Sam Keltie

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

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

E-mail: espi-rsc@rsc.org

Environmental Science: Processes & Impacts (electronic: ISSN 2050-7895) is published 12 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 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: £1839 US\$3301. 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

Environmental Science Processes & Impacts

rsc.li/espi

Environmental Science: Processes & Impacts is a multidisciplinary journal for the environmental chemical sciences, publishing high quality papers in areas including the chemistry of the air, water, soil and sediment.

Editorial Board

Editor-in-Chief

Kristopher McNeill, ETH Zürich, Switzerland

Associate Editors

Qian Liu, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, China
Matthew MacLeod, Stockholm University, Sweden
Jasquelin Peña, University of California, Davis, USA
Paul Tratnyek, Oregon Health & Science University, USA
Cora Young, York University, Canada

Members

Katye Altieri, University of Cape Town, South Africa
Ludmilla Aristilde, Northwestern University, USA
Amila de Silva, Environment and Climate Change Canada, Canada
Beate Escher, Helmholtz Centre for Environmental Research, Germany
Mingliang Fang, Fudan University, China
Delphine Farmer, Colorado State University, USA

Weihua Song, Fudan University, China
Lenny Winkel, Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland

Advisory Board

Urs Baltensperger, Paul Scherrer Institute, Switzerland
Alexandria Boehm, Stanford University, USA
Richard Brown, National Physical Laboratory, UK
Junji Cao, Institute of Earth Environment, CAS, China
Kathrin Fenner, Swiss Federal Institute of Aquatic Science and Technology, Eawag, Switzerland
Tamara Galloway, University of Exeter, UK
Philip Gschwend, Massachusetts Institute of Technology, USA
Liang-Hong Guo, China Jiliang University, China
Colleen Hansel, Woods Hole Oceanographic Institution, USA

Hans Christian Bruun Hansen, University of Copenhagen, Denmark
Stuart Harrad, University of Birmingham, UK
Heileen Hsu-Kim, Duke University, USA
Jianying Hu, Peking University, China
Young-Shin Jun, Washington University in St. Louis, USA
Andreas Kappler, University of Tübingen, Germany
Karen Kidd, McMaster University, Canada
Edward Kolodziej, University of Washington, USA
Ruben Kretzschmar, ETH Zürich, Switzerland
Derek Muir, Environment & Climate Change Canada, Canada
Kara Nelson, University of California, Berkeley, USA

Jasquelin Peña, University of California, Davis, USA
Noelle Selin, Massachusetts Institute of Technology, USA
Susan Solomon, Massachusetts Institute of Technology, USA
Elsie Sunderland, Harvard University, USA
Sachchida Nand Tripathi, Indian Institute of Technology Kanpur, India
David Waite, University of New South Wales, Australia
Frank Wania, University of Toronto at Scarborough, Canada
Guang-Guo Ying, South China Normal University, China

Information for Authors

Full details on how to submit material for publication in *Environmental Science: Processes & Impacts* 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/espi

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

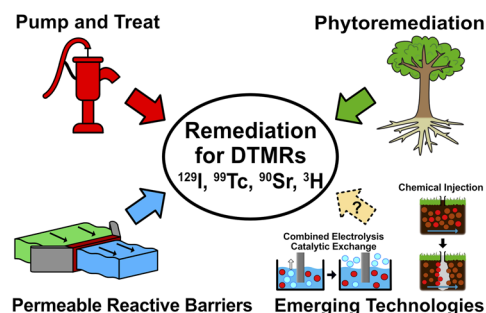


CRITICAL REVIEWS

1909

Current and emerging technologies for the remediation of difficult-to-measure radionuclides at nuclear sites

Shaun D. Hemming,* Jamie M. Purkis, Phillip E. Warwick and Andrew B. Cundy*

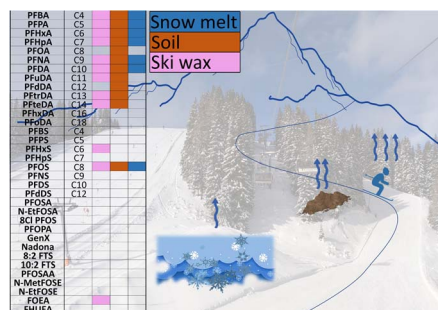


PAPERS

1926

Per and polyfluoroalkylated substances (PFAS) target and EOF analyses in ski wax, snowmelts, and soil from skiing areas

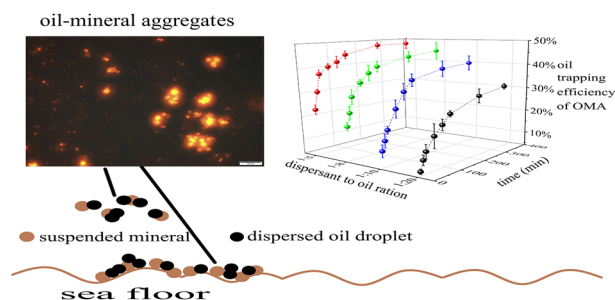
Viktoria Müller, Larissa Cristine Andrade Costa, Filipe Soares Rondan, Eleonora Matic, Marcia Foster Mesko, Andrew Kindness and Jörg Feldmann*



1937

Formation and sedimentation of oil–mineral aggregates in the presence of chemical dispersant

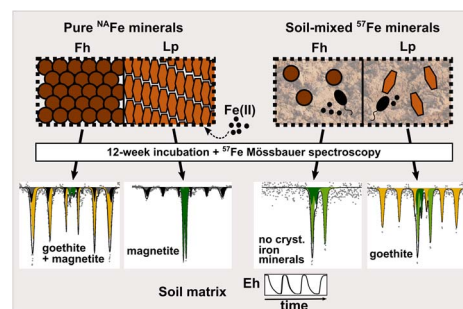
Wenxin Li, Zhixin Qi,* Deqi Xiong,* Yifei Wu, Wei Wang, Yajing Qi and Jian Guo



1945

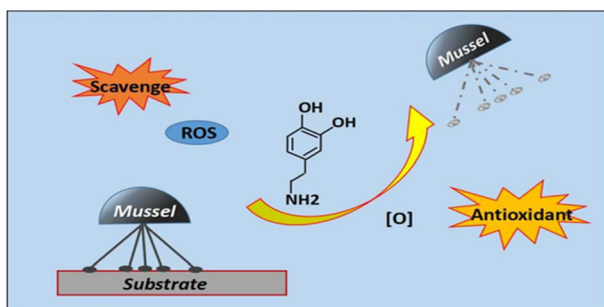
Contact with soil impacts ferrihydrite and lepidocrocite transformations during redox cycling in a paddy soil

Katrin Schulz, Luiza Notini, Andrew R. C. Grigg, L. Joëlle Kubeneck, Worachart Wisawapipat, Laurel K. ThomasArrigo* and Ruben Kretzschmar



PAPERS

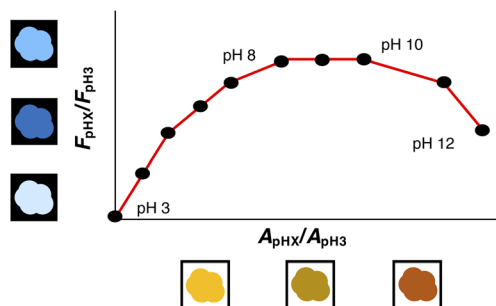
1962



Antioxidant *N*-acetylcysteine removing ROS: an antifouling strategy inspired by mussels

Jine Wang, Chen Zhang, Rui Zhao, Pei Wang,* Meihua Jin* and Jiujun Xu

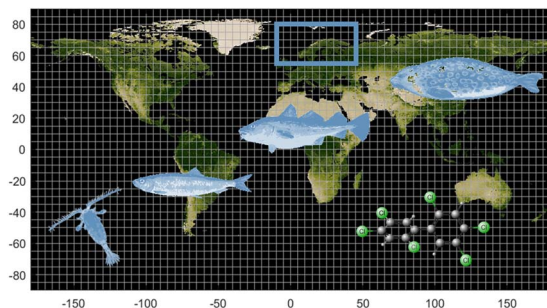
1974



Evaluating the pH-dependence of DOM absorbance, fluorescence, and photochemical production of singlet oxygen

Anya Allen, Kai Cheng and Garrett McKay*

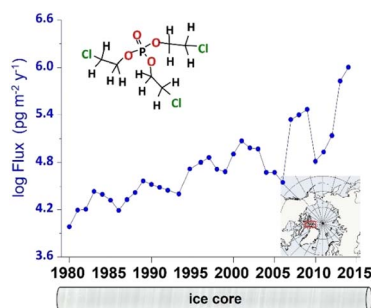
1986



Modelling PCB-153 in northern ecosystems across time, space, and species using the nested exposure model

Ingjerd S. Krogseth,* Knut Breivik, Sylvia Frantzen, Bente M. Nilsen, Sabine Eckhardt, Therese H. Nøst and Frank Wania

2001



Canadian high arctic ice core records of organophosphate flame retardants and plasticizers

Amila O. De Silva,* Cora J. Young,* Christine Spencer, Derek C. G. Muir, Martin Sharp, Igor Lehnher and Alison Criscitiello

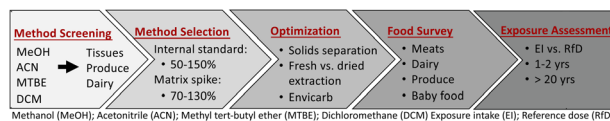


PAPERS

2015

Per- and polyfluoroalkyl substances (PFAS) in grocery store foods: method optimization, occurrence, and exposure assessment

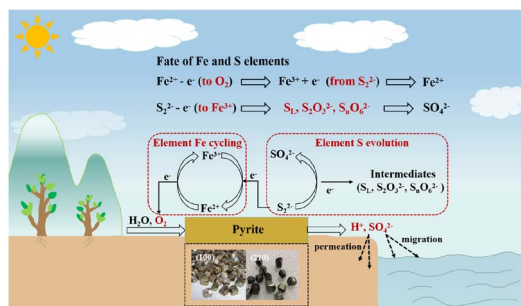
Zhao Yang, Marzieh Shojaei and Jennifer L. Guelfo*



2031

Investigating the oxidation mechanism of facet-dependent pyrite: implications for the environment and sulfur evolution

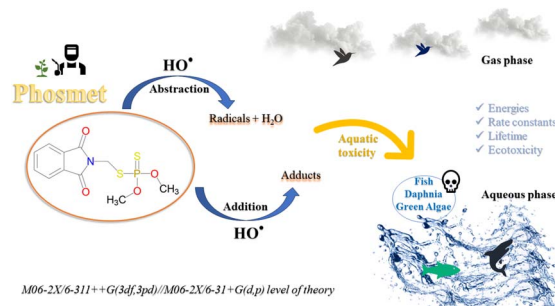
Chenrui Liu, Yun Liu,* Shuai Zeng and Dejian Li



2042

New insight into environmental oxidation of phosmet insecticide initiated by HO· radicals in gas and water – a theoretical study

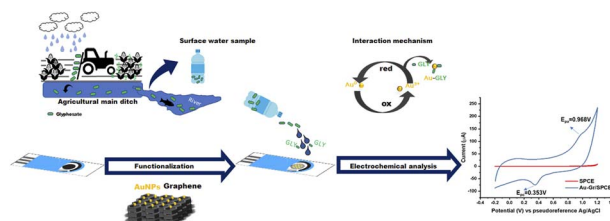
Hisham K. Al Rawas, Reem Al Mawla, Thi Yen Nhi Pham, Dinh Hieu Truong, Thi Le Anh Nguyen, Sonia Taamalli, Marc Ribaucour, Abderrahman El Bakali, Ivan Černušák, Duy Quang Dao* and Florent Louis



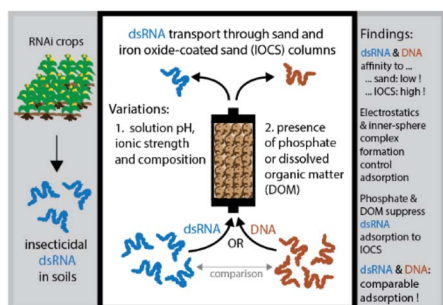
2057

Hybrid nanomaterial-based indirect electrochemical sensing of glyphosate in surface water: a promising approach for environmental monitoring

Elisabeta-Irina Geana, Angela Mihaela Baracu, Marius C. Stoian, Oana Brincoveanu, Cristina Pachiu and Livia Alexandra Dinu*



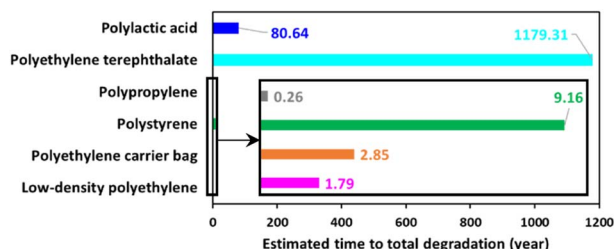
2067



Transport of double-stranded ribonucleic acids (dsRNA) and deoxyribonucleic acids (DNA) in sand and iron oxide-coated sand columns under varying solution chemistries

Katharina Sodnikar, Ralf Kaegi, Iso Christl, Martin Herbert Schroth* and Michael Sander*

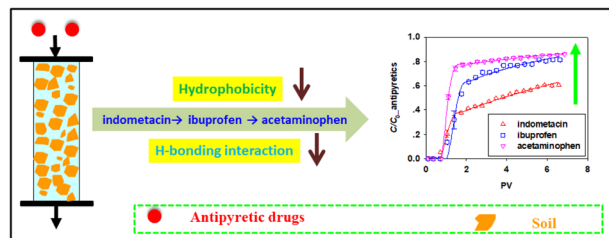
2081



Ranking the accelerated weathering of plastic polymers

Maryam Hoseini, Jess Stead and Tom Bond*

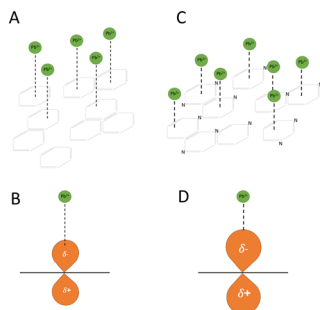
2092



Mobility of antipyretic drugs with different molecular structures in saturated soil porous media

Jiuyan Chen, Qiang Zhang, Weifeng Chen, Usman Farooq, Taotao Lu, Bin Wang, Jinzhi Ni, Huiying Zhang* and Zhichong Qi*

2102



Feedstock nitrogen content mediates maximum possible Pb sorption capacity of biochars

Chinonso Ogbuagu, Steve Robinson and Tom Sizmur*

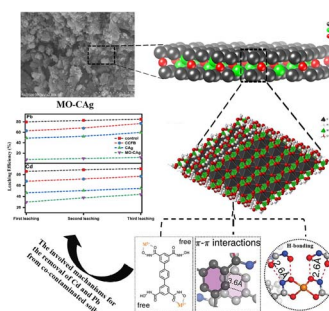


PAPERS

2110

Towards engineering mitigation of leaching of Cd and Pb in co-contaminated soils using metal oxide-based aerogel composites and biochar

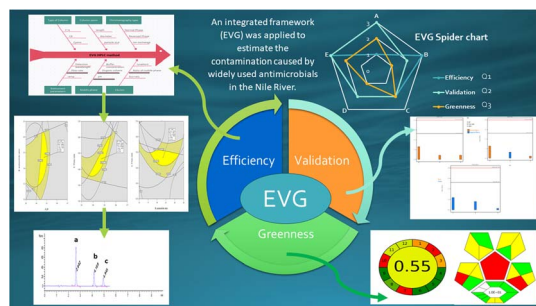
Daryoush Sanaei,* Mohammad Sarmadi,*
 Mohammad H. Dehghani, Hamidreza Sharifan,
 Paula G. Ribeiro, Luiz R. G. Guilherme and Sajjad Rahimi



2125

An integrated framework to develop an efficient valid green (EVG) HPLC method for the assessment of antimicrobial pollutants with potential threats to human health in aquatic systems

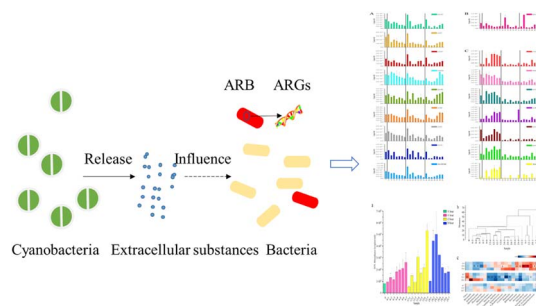
Sarah S. Saleh,* Hayam M. Lotfy and Heba T. Elbalkiny



2139

Cyanobacterial extracellular antibacterial substances could promote the spread of antibiotic resistance: impacts and reasons

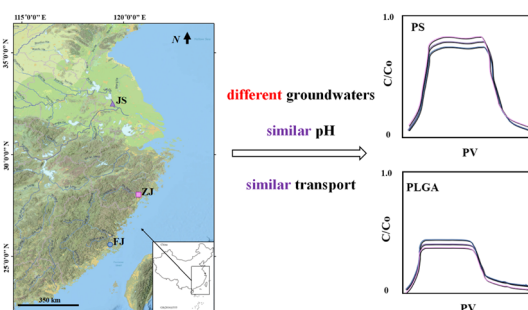
Rui Xin, Kai Zhang, Dongjin Yu, Ying Zhang,
 Yongzheng Ma* and Zhiguang Niu*



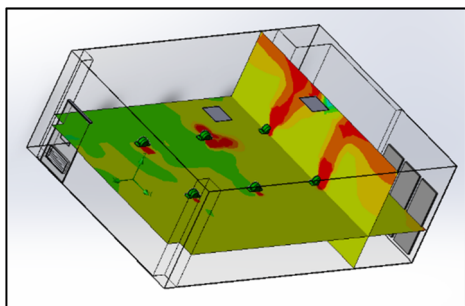
2148

Limited effects of different real groundwaters from three coastal cities in China on the transport of low-concentration nanoplastics in quartz sand

Yanan Liu, Genyao Gu, Guoqing Li, Hyunjung Kim, Li Cai*
 and Huiwen Cai*



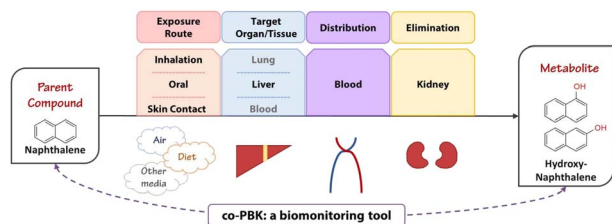
2157



Classroom aerosol dispersion modeling: experimental assessment of a low-cost flow simulation tool

P. Dacunto,* S. Nam, M. Hirn, A. Rodriguez, M. Owkes and M. Benson

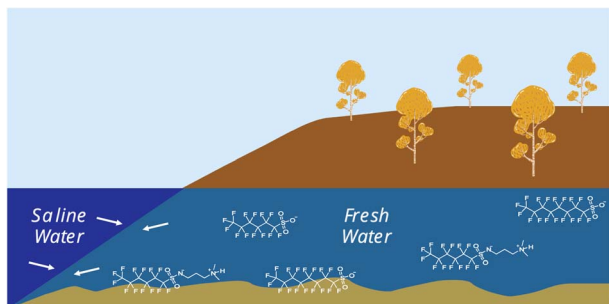
2167



Co-PBK: a computational biomonitoring tool for assessing chronic internal exposure to chemicals and metabolites

Xiaoyu Zhang and Zijian Li*

2181



Enhanced aggregation and interfacial adsorption of an aqueous film forming foam (AFFF) in high salinity matrices

Sophia D. Steffens, David L. Sedlak and Lisa Alvarez-Cohen*

