

# 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 3(2) 147–348 (2024)



### Cover

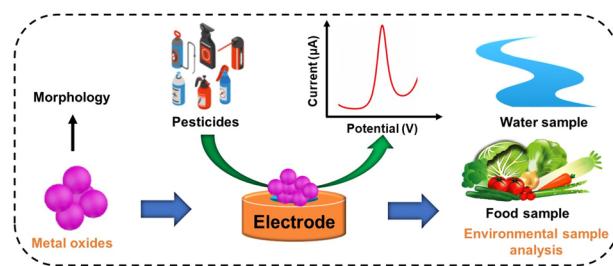
See Yuejie Ai, Xiangke Wang et al., pp. 177–185. Image reproduced by permission of Tao Wen, Yuejie Ai, Xiangke Wang et al. from *Environ. Sci.: Adv.*, 2024, 3, 177.

## CRITICAL REVIEW

154

### Metal oxide-based electrochemical sensors for pesticide detection in water and food samples: a review

Selvarasu Maheshwaran, Wei-Hsin Chen,\* Sheng-Lun Lin, Mohammad Ghorbani and Anh Tuan Hoang

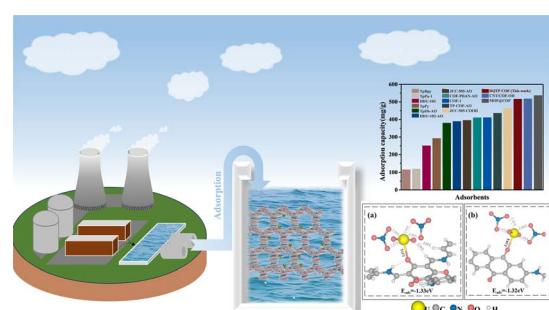


## PAPERS

177

### Identification of oxygen sites in $\beta$ -ketoenamine-linked covalent organic frameworks for highly efficient uranium adsorption through experimental and theoretical studies

Tao Wen, Xinjie Ma, Yingzhong Huo, Ruoxuan Guo, Sai Zhang, Yanan Han, Yang Liu, Yuejie Ai\* and Xiangke Wang\*



# Royal Society of Chemistry approved training courses

Explore your options.  
Develop your skills.  
Discover learning  
that suits you.

**Courses in the classroom,  
the lab, or online**

Find something for every  
stage of your professional  
development. Search our  
database by:

- subject area
- location
- event type
- skill level

Members get at least 10% off

Visit [rsc.li/cpd-training](http://rsc.li/cpd-training)

**SAVE  
10%**

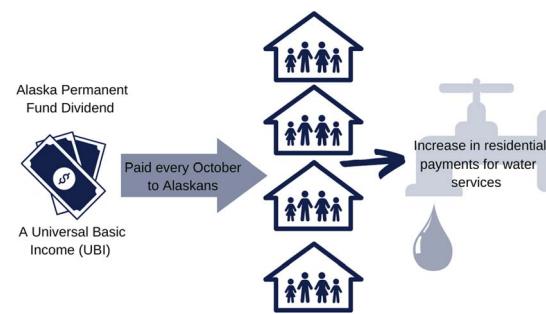


## PAPERS

186

## The Alaska permanent fund dividend increases residential payments for water services

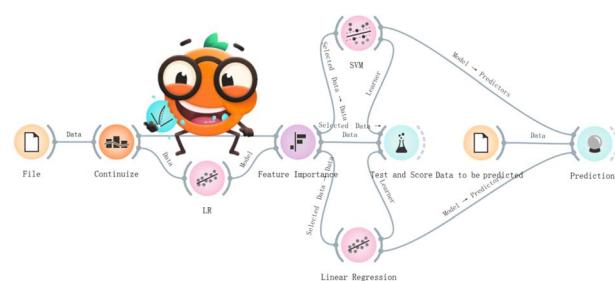
Barbara Johnson,\* Allen Molina, Mark Herrmann and Srijan Aggarwal\*



198

## Modelling and predicting liquid chromatography retention time for PFAS with no-code machine learning

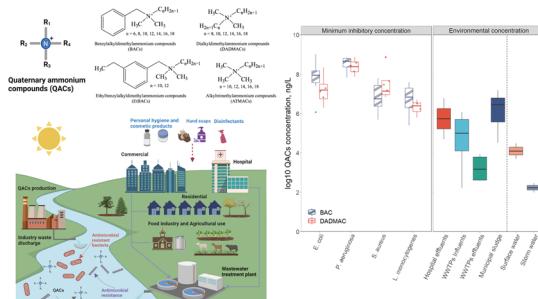
Yunwu Fan, Yu Deng, Yi Yang, Xin Deng, Qianhui Li, Boqi Xu, Jianyu Pan, Sisi Liu, Yan Kong and Chang-Er Chen\*



208

## Quaternary ammonia compounds in disinfectant products: evaluating the potential for promoting antibiotic resistance and disrupting wastewater treatment plant performance

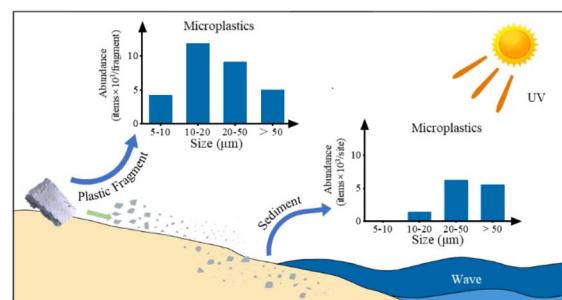
Zihao Lu, Anna K. Mahony, William A. Arnold, Christopher W. Marshall and Patrick J. McNamara\*



227

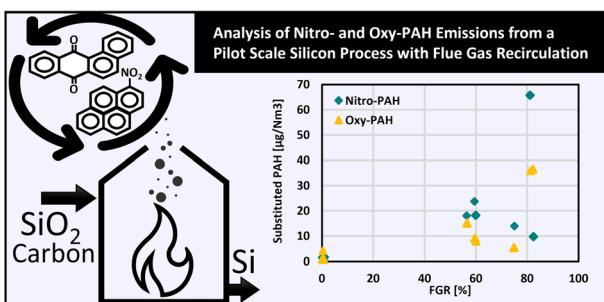
## The missing small microplastics: easily generated from weathered plastic pieces in labs but hardly detected in natural environments

Fangni Du, Huiwen Cai, Lei Su, Wei Wang, Liwu Zhang, Chengjun Sun, Beizhan Yan and Huahong Shi\*



## PAPERS

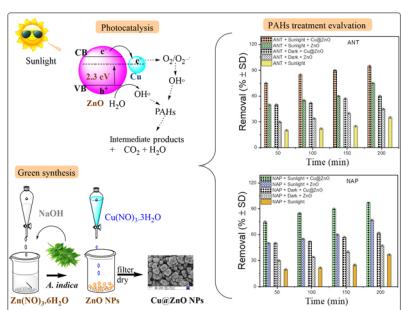
239



### Analysis of nitro- and oxy-PAH emissions from a pilot scale silicon process with flue gas recirculation

Kamilla Arnesen, Vegar Andersen, Katarina Jakovljevic, Ellen Katrin Enge, Heiko Gaertner, Thor Anders Aarhaug, Kristian Etienne Einarsrud and Gabriella Tranell\*

249



### Sunlight light-driven degradation of anthracene and naphthalene on robust Cu<sup>2+</sup>-doped ZnO nanoparticles from simulated rainwater: optimization factors, kinetics, and reusability

Meenu, Manviri Rani\* and Uma Shanker\*

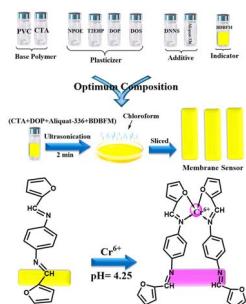
266



### Life cycle assessment, quo vadis? Supporting or deterring greenwashing? A survey of practitioners

Miguel Brandão,\* Pablo Busch and Alissa Kendall

274



### Development of an innovative optical sensor to detect extremely low levels of chromium in real samples using colorimetric methods

Eman R. Darwish, Reem F. Alshehri, Alaa S. Amin\* and Mai Aish

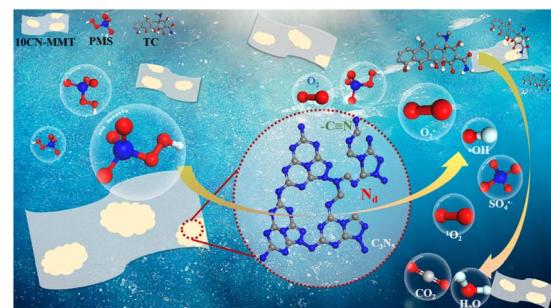


## PAPERS

290

## Anchoring defective metal-free catalysts on montmorillonite nanosheets for tetracycline removal: synergistic adsorption-catalysis and mechanism insights

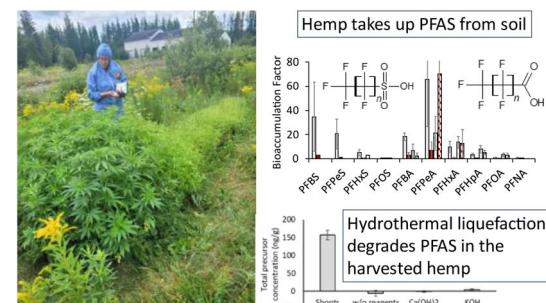
Min Li, Xudong Liu, Zhinan Xie, Chunfang Du\* and Yiguo Su\*



304

## A comprehensive trial on PFAS remediation: hemp phytoextraction and PFAS degradation in harvested plants

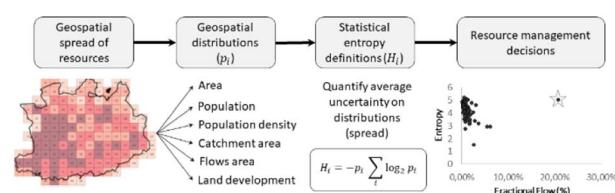
Sara L. Nason,\* Sara Thomas, Chelli Stanley, Richard Silliboy, Maggie Blumenthal, Weilan Zhang, Yanna Liang, Jasmine P. Jones, Nubia Zuverza-Mena, Jason C. White, Christy L. Haynes, Vasilis Vasiliou, Michael P. Timko and Bryan W. Berger



314

## Evaluating spatial material distributions: adopting geospatial entropy definitions into resource management

Cristina Moyaert, Philippe Nimmegeers, Bilal Mellouk, Dimitri Voordeckers, Paul De Meulenaere and Pieter Billen\*



332

## The electric vehicle transition

Boucar Diouf

