

Institute of Optics and Fine Mechanics, China. The project is bringing together polymer experts, analytical chemists, environmental scientists, and a diversity of stakeholders and experts from all areas to work together on this important, interdisciplinary topic.

The symposium was chaired by Hemda Garelick from Middlesex University, UK. Fani Sakellariadou from the University of Piraeus, Greece gave a keynote talk titled *"Microplastic pollution in the marine environment."* Balwant Singh from the University of Sydney (Australia) delivered an invited talk on "Microplastics contamination and their impacts in soil ecosystems." Different views on the challenges of microplastics were presented – see program summarized in the table.

Various topics including plastic product innovation, industrial leadership with extender producer responsibility, advanced plastic waste remediation and recycling techniques, diversified plastic waste management systems, together with strong commitments from local and international organizations and governments were discussed. The symposium outcomes will provide a scientific base to support the understandings and actions to prevent and reduce microplastic pollution and enhance the safety of humans, aquatic animals and the ecosystem. The symposium along with the IUPAC microplastic project will strengthen the role of IUPAC in contributing to solving environmental problems and enhancing the quality of food and life on a global scale.

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Poly- and perfluoroalkyl substances (PFAS) in the environment

by Melanie Kah and Rai Kookana

Per- and polyfluoroalkyl substances (PFAS) are a major environmental concern globally due to their widespread usage and persistence. They found widespread applications in industry due to their unique chemistry of having both hydrophilic and hydrophobic (surfactant-like) properties. However, concerns about these chemicals have been growing due to their long-term persistence in the environment, potential for bioaccumulation and toxicity to human and ecological health.

In 2001, when it was realized that PFASs are bioaccumulative, PFAS production started to be phased out in Western Countries. However, it continued in Asia thus shifting the problem to emerging economies. Unfortunately, the true extent of PFAS problem has not

been yet recognized in the emerging economies and this may become a serious issue for the local environments and population.

With the aim of raising awareness around this important environmental issue, IUPAC Division VI held a symposium on "Poly- and Perfluoroalkyl Substances (PFAS) in the Environment" on Monday 7 November 2022 in Siem Reap (Cambodia) as part of the APCE-CECE-ITP-IUPAC 2022 Conference.

This symposium was part of IUPAC Project 2019-029-1-600 *"Per and polyfluoroalkyl substances (PFASs) in the environment: Information for emerging economies on PFASs analyses in environmental media and their impacts on human health"* led by Melanie Kah of the University of Auckland, New Zealand. The project, through a multidisciplinary approach, aims at coping with three overarching aspects around PFAS, namely: analytical chemistry in environmental media, human health effects from environmental exposure, and PFAS management response by regulatory and policy agencies.

At the PFAS symposium, nine speakers represented a diversity of perspectives and approaches to tackle the PFAS environmental problem across the USA, Australia, New Zealand, the Philippines, China and Canada.

The first session was chaired by Rai Kookana (CSIRO/ University of Adelaide, Australia) to set the scene by covering general aspects related to the challenges of dealing with contamination with PFAS. Topics included the behaviour of PFAS in soil by the keynote speaker Christopher Higgins (Colorado School of Mines, USA), occurrence and fate in wastewater treatment plants, risk assessment, management, and remediation of PFAS. Other speakers included Karl Bowles (RPS AAP Consulting Pty Ltd), Melanie Kah, Balwant Singh (University of Sydney, Australia), and Divina Navarro (CSIRO/University of Adelaide, Australia).

The second session was chaired by Melanie Kah (IUPAC Project Task Group Chair), and covered aspects more specific to Asia. These included the bio-monitoring work carried out by the keynote speaker, Michael Velarde (University of the Philippines Diliman), an overview on data available on the occurrence of PFAS in soil and water in Asia, and China in particular. Other speakers were Rai Kookana, Guang-Guo Ying (South China Normal University, China) and Zoltan Mester (National Research Council of Canada).

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