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PREFACE

Bridging science, technology and policy in emerging contaminants control

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Emerging contaminants refer to newly discovered or previously overlooked contaminants that pose potential risks to the ecological environment and human health. They have not been included in environmental management practices or are inadequately addressed by existing management measures. Main focuses of emerging contaminants include persistent organic pollutants, endocrine disrupting chemicals, antibiotics and microplastics, among others. These contaminants have been widely detected in the environment and are considered urgent concerns for environmental safety and human health. However, compared to traditional pollutants, emerging contaminants are generally not well regulated by law-enforcement agencies.

The environmental risk control of emerging contaminants has attracted more and more concerns worldwide. The U.S. Environmental Protection Agency released the "PFAS (per- and polyfluoroalkyl substances) Strategic Roadmap" in 2021, and the European Chemicals Agency published a PFAS restriction proposal in 2023. The year 2022 is considered as the "first year" of China's emerging contaminant control action. Since this year, a national-level action plan has been gradually implemented from the national government to provincial governments and then to prefecture-level and county-level cities in China. "Emerging contaminant control" was included as one of ten key tasks in the "14th Five-Year" special plan for scientific and technological innovation in the field of ecological environment by Ministry of Science and Technology, Ministry of Ecology and Environment, and three other departments of China. Despite the tremendous efforts and progress made in this field, the environmental occurrence, sources, and risks of emerging contaminants have not been fully understood, and the full-scale implementation of control technologies to meet practical application requirements has not been achieved. "What are the problems and challenges faced by emerging contaminant control?" was selected as one of the top 10 cutting-edge scientific issues by the China Association for Science and Technology, and "Mechanisms of multi-media transport and transformation of emerging contaminants" was selected as one of the top 10 engineering research fronts in the field of environmental and light textile engineering by Chinese Academy of Engineering in 2022. To address these issues and fill the knowledge gaps, we proposed this special issue and received submissions from all over the world.

This special issue successfully gathered a collection of research articles that addressed various topics related to emerging contaminants, including their environmental analysis and occurrence, human exposure and risk assessment, control technology and degradation mechanism, and control strategies and achievements. Particularly, this issue reported on twenty years of achievements in China's implementation of the Stockholm Convention, and perfluoroalkane acids in human milk under the global monitoring plan of the Stockholm Convention (2008–2019). We hope that this special issue will inform international scientists, government agencies, and the general public about recent advances and challenges related to emerging contaminants research and control, and bridge the gap between science and policy to control their environmental risks.

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