

Ph.D. project on microplastics

Plastic pollution is a growing concern, and the United Nations Environment Programme (UNEP) has identified plastic debris as one of the most important emerging environmental issues. Microplastics, defined as plastic fragments with a diameter below 5 mm, are ubiquitous in the environment, including remote regions. Microplastics is a “cocktail” of contaminants: they may adsorb inorganic and organic chemicals on their surface or leach plastic additives such as plasticizers, flame retardants, and UV stabilizers to the environment. Preliminary studies have shown that exposure of plastics to sunlight in seawater can affect their physicochemical properties and release chemical contaminants and important trace gases such as methane and non-methane hydrocarbons. However, our knowledge remains very limited about the phototransformation processes of microplastics and their environmental significance. This project aims to better understand how phototransformation affects the physical and chemical characteristics of microplastics and to assess the production potentials of chemical contaminants and trace gases (methane, non-methane hydrocarbons, carbon monoxide, and hydrogen) from photodegradation of microplastics in seawater. Results from this project will improve our understanding of the transport, transformation, and fate of microplastics in the marine environment and help develop rational approaches to mitigating climate change and protecting human and ecosystem health.

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