Stony Brook University

Department of Civil Engineering

College of Engineering and Applied Sciences

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Dr. Yi Zhang, Ph.D.

Postdoctoral Researcher, NY State Center for Clean Water Technology,
Stony Brook University

Friday, September 23rd, 1:00 – 1:55 PM
Frey Hall Room 201

Unraveling per- and polyfluoroalkyl substances (PFAS) challenges and opportunities: Improving short-chain PFAS sorption via ion-pairing technique by conventional granular activated carbon (GAC)

Abstract

Per- and polyfluoroalkyl substances (PFAS) are synthetic organic compounds and are present globally in water, air, dust, and consumer products. PFAS are of concern because of their high resistance to degradation (highly stable C-F bond) and their adverse human health and environmental effects. Removing PFAS from waters and understanding the removing mechanisms are thus highly desired. Granular activated carbon (GAC) adsorption is one of the most applicable treatment technologies which is effective in removing long-chain perfluoroalkyl substances (PFAS) such as perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) but suffers from relatively poor performance when treating hydrophilic short-chain PFAS. In this talk, a mechanistic understanding of the low removal of short-chain PFAS, including long-chain PFAS competition and co-existing ion inhibition effects, will be discussed. An innovative treatment process employing the ion-pairing technique will be presented. The sorption mechanisms examined via batch isotherm, rapid small-scale column test (RSSCT), and surface tension measurements will be discussed. The impacts of chain length, charge, and dose dependence of the selected ion-pair reagents on the PFAS sorption will also be presented.

Speaker Biography

Dr. Yi Zhang is a Postdoctoral Associate with the CCWT. Dr. Zhang has a M.S. in Material Science from the University of Science and Technology of China (2008), where her research focused on synthesizing non-fluorinated green flame-retardant materials. She further pursued her PhD research in Environmental Chemistry at the University of Maryland-College Park (2014), with a focus on understanding the mechanistic redox pathways for reactive oxygen species (ROS) productions and phenol degradation. She has investigated the molecular structure and optical properties of chromophore dissolved organic matters with related photochemical redox mechanism and transformation of organic pollutants in natural aquatic environments. Before joining CCWT, she was a postdoctoral researcher in the Environmental Engineering Department at Temple University (2019). Her postdoctoral research has focused on the removal of a suite of PFAS using selected anion exchange resins and GAC in groundwater systems. As an instrumental analyst, she has extensive experience in data analysis, trouble shooting and instrumental maintenance. Dr. Zhang's research interests include two major areas: 1) investigating the mechanistic redox transformation of organic containments in natural or engineered aquatic systems using kinetic modeling or molecular probing and 2) developing models for real world application with emphasis on emerging contaminant (e.g., PFAS) removal and destruction.