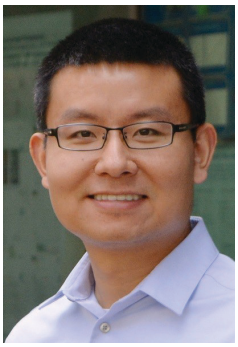
BREN SEMINAR

UV PHOTOLYSIS OF CHLORAMINES FOR POTABLE WATER REUSE



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Monday, January 14, 2019 11:00 – 12:00
Bren Hall 1414
Watch live at https://ucsb.zoom.us/j/160913604

"By integrating fundamental principles of surface chemistry, electrochemistry, and chemical kinetics modeling with advanced analytical capacities, Dr. Liu's group innovates in using aquatic chemistry principles for engineering solutions in water purification and wastewater reclamation."
— Trish Holden, Professor, Bren School

ABSTRACT Ultraviolet-driven advanced oxidation processes (UV/AOP) are becoming increasingly important for potable water reuse to remove trace chemical contaminants from wastewater effluent. This seminar will discuss the unique aqueous photochemistry of the overlooked but important chloramines for water reuse applications. Membrane treatment processes including microfiltration (MF) and reverse osmosis (RO) are employed prior to any UV/AOP in water reuse facilities. Chloramines are deliberately generated in the feed water to minimize membrane biological fouling. Because of their small molecular size and neutral charge, chloramines easily diffuse through RO membranes, and subsequently will undergo photolysis in the UV/AOP. We investigated the efficiencies of chloramines in degrading 1,4-dioxane under low-pressure UV lamp photolysis. The photolysis of chloramines produced amine and halide radicals, which further transformed to a series of reactive radical species that assist the contaminant degradation. We are also currently conducting pilot-scale photochemical experiments utilizing chloramine photolysis with our industrial partners. Considering the perspective of potable water reuse, an efficient utilization of chloramine photochemistry can lead to more sustainable water management.

BIO Haizhou Liu is an Associate Professor in the Department of Chemical and Environmental Engineering at the University of California, Riverside. He received his PhD from the University of Washington and his postdoctoral training from UC Berkeley before joining UC Riverside in 2013. Professor Liu's research interests include water chemistry, water reuse and purification, and environmental remediation. His current research has been sponsored by the National Science Foundation, Department of Interior, Department of Agriculture, and Water Research Foundation. Professor Liu received an Emerging Investigator Award in Water Engineering and Technology from the Royal Society of Chemistry in 2016, a National Science Foundation Faculty Early Career Development (CAREER) Award in 2017, and an Environmental Science & Technology Excellence in Review Award in 2018.

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