

MECHANISTIC STUDY OF REACTIVE RADICAL AND NITROSAMINE FORMATION IN BREAKPOINT CHLORINATION CHEMISTRY

Speaker

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Abstract

In this seminar, Dr. Chuang will present their latest research on breakpoint chlorination, with a focus on the mechanisms underlying the enhanced formation of nitrosamines, a group of carcinogenic disinfection byproducts, and reactive radicals. Breakpoint chlorination reactions are prevalent in drinking water and potable reuse treatments where chlorine is applied to waters containing ammonia or chloramines. While the formation of reactive species aids in micropollutant removal, reducing the overall treatment burden, the concurrent formation of carcinogenic nitrosamines complicates the treatment process. Understanding these mechanisms is crucial for optimizing operational conditions in water and potable reuse treatments. Our research extensively investigated the reactions occurring during breakpoint chlorination and identified the interaction between trichloramine and dichloramine as a major contributing factor. A kinetic model was developed to evaluate the significance of the chloramine interactions in the formation of reactive species and the enhanced formation of nitrosamines.

Biography

Yi-Hsueh Brad Chuang is an Associate Professor at the Institute of Environmental Engineering at National Yang Ming Chiao Tung University. He earned his Bachelor of Science in Environmental Engineering from National Cheng Kung University in 2007 and completed his Ph.D. in Environmental Engineering at National Taiwan University in 2013. Following his doctoral studies, Dr. Chuang undertook a postdoctoral fellowship at Stanford University, where he worked from 2014 to 2019. Dr. Chuang's research interests include potable reuse, environmental chemistry, and advanced oxidation processes. His work is driven by a commitment to advancing sustainable environmental practices and developing innovative solutions for water treatment and reuse. Through his research, Dr. Chuang aims to address critical environmental challenges and contribute to the protection of public health and the environment.



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Civil Engineering
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