Brown Bag Lunch Seminar Series

Moving past Freshwater: The Disinfection of Saline Ballast Waters and Beyond

Dr. Amisha Shah is an assistant professor in Civil Engineering (CE) and Environmental and Ecological Engineering (EEE) at Purdue University. Dr. Shah received her Ph.D. in Environmental Engineering from Georgia Institute of Technology in 2008 and received her B.S. in Chemical Engineering (currently the Department of Energy, Environmental and Chemical Engineering) from Washington University in St. Louis in 2002. She was a post-doctoral associate in the Department of Chemical and Environmental Engineering at Yale University from 2008 to 2012 and a research associate in the Water Resources and Drinking Water division at the Swiss Federal Institute of Aquatic Science and Technology (EAWAG) from 2012 to 2014. Dr. Shah's research focuses on understanding the role of various physico-chemical processes on water quality during water treatment, sustainable water reuse, ballast water treatment, and CO_2-capture technologies. Specific interests include evaluating chemical reaction kinetics and byproduct formation during disinfection (e.g. chlorination, ozonation, and UV treatment) and evaluating mass transport mechanisms and contaminant rejection during membrane filtration. Dr. Shah is currently teaching Environmental Analytical Chemistry for the Fall 2014 semester.

Sept 11 at noon in Birck Nanotechnology Center (BRCK 2001)

Abstract

Disinfection is one of the most critical components in providing pathogen-free drinking water to the global community but has shown to have negative impacts on water quality due to the formation of disinfection by-products (DBPs). In recent years, the role of disinfection has become complicated by the fact that as drinking water demands increase, the type of water that is treated has changed dramatically. Waters have become impaired by wastewater and industrial waste effluents, algal blooms, and agricultural runoff, and more saline waters, such as those used in desalination, are being treated.

In this talk, my goal will be illustrate how such differences in water quality characteristics can largely impact the potential for disinfectants to form DBPs. Ballast water disinfection will be targeted as a focal point since these waters, which typically consist of brackish and seawaters, differ significantly from freshwaters in salinity and dissolved organic matter (DOM) content. Three disinfectant types will be discussed including chlorination, ozonation, and peracetic acid treatment. Results will be presented for both synthetic salt waters and real waters ranging from freshwater, brackish water, to seawater. First, the effect of salinity will be presented in which formation of bromate was not found to increase proportionally with the increasing bromide concentration. Second, the effects of DOM type, oxidant type, and temperature on DBP (bromate, trihalomethanes, and haloacetic acids) formation will be discussed. Lastly, the role of peracetic acid treatment in DBP formation will be presented in detail given that little is known regarding its effects, and interesting results were obtained regarding the additional role of hydrogen peroxide (H_2O_2). Together, these results will provide a glimpse of the important effects that altered water conditions can have on overall water quality during disinfection.

For more information visit www.purdue.edu/dp/water or call (765) 494-1610

Sandwiches provided

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