Department of Chemical and Environmental Engineering

2015—2016 Seminar Series

Friday, December 4, 2015

9:30-10:30am

Bourns A265

Francois Perreault

Assistant Professor

School of Sustainable Engineering and the Built Environment

Arizona State University

Graphene Nanomaterials for Biofouling Control in Membrane-Based Water-Treatment

Fouling of membranes by microorganisms is a major limiting factor in membrane-based water treatment. Membrane biofouling reduces permeate water flux and membrane selectivity, resulting in increased operation costs for membrane processes. Traditional biofilm control strategies are not compatible with the polyamide thin-film composite membranes used in advanced membrane technologies and therefore, for these membranes, novel biofilm mitigation strategies are required. In this seminar, the potential of graphene for biofouling control in membrane processes is explored. The unique physicochemical properties of graphene oxide are used to impart antimicrobial and antifouling properties to membranes via a surface functionalization approach. Graphene oxide functionalized membranes are shown to successfully reduce biofilm formation on membranes without altering the membrane transport properties. The antimicrobial and antifouling mechanisms of graphene oxide are then described, providing a fundamental insight into the interactions of graphene oxide with organic and biological foulants.

BioSketch: François Perreault joined Arizona State University in 2015 as an assistant professor in the School of Sustainable Engineering and the Built Environment. Prior to ASU, he completed his Ph.D. in Environmental Sciences in the Institute of Environmental Sciences and the Department of Chemistry of the University of Quebec in Montreal. He then moved to Yale University as an NSERC postdoctoral fellow in the Department of Chemical and Environmental Engineering. In his research, he explores the interface between biological and engineered systems, with an emphasis on environmental nanotechnology, nanotoxicology, environmental microbiology, and water quality. François Perreault is an assistant professor in the School of Sustainable Engineering and the Built Environment. His work lies at the interface between biological and engineered systems, where he uses an interdisciplinary approach combining the tools of microbiology, chemistry, and nanotechnology to address the critical issues related to water quality and water treatment.

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