Department of Chemical and Environmental Engineering

2015—2016 Seminar Series

Friday, March 11, 2016

9:30-10:30am

Winston Chung Hall 205/206

Baolin Deng

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University of Missouri

Designing nanocomposite membranes for water treatment and reuse

One of the grand challenges afflicting human society is inadequate access to suitable water resources. Membrane water treatment is expected to play an increasingly important role in addressing the water challenge. In this presentation, I plan to discuss the development of polymer-matrix nanocomposite membranes for drinking water treatment, brackish and seawater desalination, and wastewater treatment and reuse. The advanced nanocomposite membranes could be designed to meet specific water treatment applications by tuning their structure and physicochemical properties (e.g. hydrophilicity, porosity, charge density, and thermal and mechanical stability) and introducing unique functionalities (e.g. antibacterial, photocatalytic or adsorptive capabilities). Based on the membrane structure and location of nanomaterials, nanocomposite membranes could be classified into (1) conventional nanocomposite, (2) thin-film nanocomposite (TFN), (3) thin-film composite (TFC) with nanocomposite substrate, and (4) surface located nanocomposite. Examples will be presented to illustrate how materials properties could be explored to enhance membrane performance and antifouling characteristics. Challenges and future research directions in developing high performance nanocomposite membranes will also be discussed.

Biosketch: Dr. Baolin Deng is currently C. W. LaPierre Professor in the Department of Civil & Environmental Engineering and Director, Missouri Water Resources Research Center (MoWRRC). He obtained his Ph.D. degree from the Johns Hopkins University in 1996 and conducted research in the US Air Force Research Laboratory as NRC Research Associate prior to his academic career, first at New Mexico Tech and then at MU since 2001. Deng's research concerns with drinking water treatment, wastewater treatment and reuse by membrane filtration, and fundamental kinetics and mechanism of contaminant transformation in aquatic systems. He has been PI/co-PI for three dozen research projects including the CAREER award from the National Science Foundation, and published over 90 journal articles and 9 book chapters. Deng is the Associate Editor/Asian regional editor for Environmental Engineering Science. He teaches several undergraduate and graduate courses, including *Fundamentals of Environmental Engineering*, *Physicochemical and Biological Processes*, *Environmental Sustainability*, *Water Treatment Process Design*, *Aquatic Chemistry*, *Environmental Chemical Kinetics*, and *Hazardous Waste Management*.

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