



ENVIRONMENTAL AND ECOLOGICAL ENGINEERING

Seminar Announcement

Charles J. Werth, Ph.D.

Professor and Arthur and Virginia Nauman Faculty Scholar
Assoc. Head for Graduate Affairs and Director of Research
Department of Civil and Environmental Engineering
University of Illinois at Urbana-Champaign

Development of Sustainable Catalytic Materials for Removal of Oxyanions in Drinking Water

3:30 pm, Tuesday, February 11, 2014

Location: Armstrong Hall Rm. 1021

Abstract

Oxyanions are among the most widespread and toxic drinking water contaminants in the world, and include nitrate, nitrite, perchlorate, and bromate. Ion exchange is typically used to remove oxyanions from drinking water, but the contaminants are only transferred to waste brine and further treatment or disposal is required. One promising approach to treat oxyanions in drinking water is Pd-based catalytic reduction, either as a stand-alone process or in combination with ion exchange to treat and reuse brine. Typically Pd and a promoter metal (e.g., In, Cu, Re) are combined with hydrogen to reduce oxyanions to benign end product (e.g., chloride for perchlorate, di-nitrogen for nitrate). In this talk, I will present life cycle assessment (LCA) results that demonstrate the sustainability benefits of treating nitrate in waste brine using a Pd-In on activated carbon catalyst, and the need to improve catalytic activity. I will then present results showing how the geometry of Pd nanocrystals can be tailored to enhance catalytic activity, and how further gains in catalytic activity can be realized by loading the Pd nanocrystals onto novel supports.

Biosketch

Charles J. Werth holds a B.S. (Texas A&M University, 1988) degree in mechanical engineering, and M.S. (Stanford University, 1992) and Ph.D. (Stanford University, 1996) degrees in environmental engineering and science. He also holds a Ph.D. minor (Stanford University, 1996) in Chemistry. Dr. Werth has been on the faculty of the department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign since 1997. He has taught graduate and undergraduate courses in hazardous waste site assessment, remediation and management, environmental transport modeling, sustainable urban engineering, and drinking water treatment processes. Dr. Werth is a member of the American Chemical Society, the American Geophysical Union, and the Association of Environmental Engineering and Science Professors, and is a Fellow of the Department of Energy's William R. Wiley Environmental Molecular Sciences Laboratory. He has received a number of awards, including the National Science Foundation's CAREER Award, the Arthur and Virginia Nauman Faculty Scholar Award, the Humbolt Research Fellow Award, and the BP Award for Innovation in Undergraduate Instruction.