



The BRACE CENTRE FOR WATER RESOURCES MANAGEMENT

Dr. Mark R. Wiesner

James L. Meriam Professor of Civil and Environmental Engineering
Duke University

PHYSICAL-CHEMICAL FACTORS CONTROLLING NANOPARTICLE EXPOSURE, TRANSFORMATION AND REACTIVITY

The properties of nanomaterials are transformed significantly due to interactions with environmental and physiological matrices. This presentation explores the role of nanomaterial-macromolecule interactions as they affect aggregation, deposition and reactivity using fullerenes as an example. The chemistry of reactive oxygen species (ROS) generation is presented and the relationship between the morphology of nanoparticle aggregates and their reactivity is explored. Alternations to nanoparticle ROS production as the result of matrix effects, in particular those representing commonly used growth media, are discussed. Changes in the affinity of fullerenes for a reference solid phase are presented as function of the nature of adsorbing macromolecules, and the significance of these results for nanoparticle transport are highlighted. Finally, the importance of accounting for nanoparticle transformations in bioavailability and toxicity studies is discussed.

Dr. Mark Wiesner earned his Ph.D. in Environmental Engineering from The Johns Hopkins University. He is a Professor in the Department of Civil and Environmental Engineering at Duke University and held the Chair of Excellence at the Université Paul Sabbatier in Toulouse, France from 2005 to 2006. Wiesner is also one of three founders of the Houston-based Oxane Materials Inc., a nanomaterials company offering high temperature stable PEM fuel cell membranes, low-cost composites, and coatings that can withstand extreme environments. Dr. Wiesner's research interests include membrane processes, nanostructured materials, transport and fate of nanomaterials in the environment, colloidal and interfacial processes, environmental systems analysis and energy technologies.

Monday, March 17th, 2008

McGill Downtown Campus, Macdonald Engineering Building, Room 280
9:15 - 10:15 am

EVERYONE WELCOME