DEPARTMENT OF CHEMISTRY AND ENVIRONMENTAL SCIENCE

SPRING 2017 SEMINAR SERIES

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WEDNESDAY, APRIL 26, 2017 **TIERNAN HALL**
2:30 PM **ROOM 373**

GUEST SPEAKER

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TOPIC

Removal of Neutral and Ionic Organic Contaminants by Polymeric Resins – Predictive Modeling and Catalytic Reduction

ABSTRACT

Emerging organic contaminants are a growing concern for water treatment as their presence in the environment continues to grow. The focus of this work was to develop technologies to selectively remove neutral and ionic organic contaminants from water using polymeric resins. Three neutral resins (MN200, XAD-4, and XAD-7), three anion exchange resins (Amberlite IRA-910 and IRA-96, and Purolite A860), and two cation exchange resins (Amberlite 200 and MN500) were examined for the removal mechanisms of various neutral and ionic organic contaminants. The sorption isotherms demonstrated that the ion exchange resins have affinity for compounds in the following order: aromatic ions > aliphatic ions > neutral compounds. This preference is due to the differences in non-electrostatic interactions of the compounds such as their H-bonding capability, affinity for Van der Waals and π-π interactions, and the size of the molecular cavity in solution. Resins' ion exchange capacity and hydrophilicity are mainly responsible for the observed different sorption behavior of various resins. With the above findings and the development of poly-parameter linear free-energy relationships (pp-LFERs), predictive models were developed to accurately estimate the sorption of various compounds onto all the resins under changing pH conditions.

Moreover, predictive models for adsorption of multi-solute mixtures were successfully developed; novel resin-Pd composite materials were synthesized and optimized to achieve selective removal of contaminants and in-situ regeneration of the spent catalyst.

BIOGRAPHY

Dr. Huichun (Judy) Zhang is an associate professor in the Department of Civil and Environmental Engineering at the Temple University, Philadelphia, PA. She earned her Ph.D. from Georgia Institute of Technology and her bachelor's and Master's degrees from Nanjing University. Her research focuses on the fate and transformation of environmental contaminants in natural and engineered aquatic environments and sorption mechanisms and modeling for the removal of organic contaminants from contaminated water. Dr. Zhang has published in numerous journals, including Environmental Science and Technology, Journal of Physical Chemistry C, Langmuir, Applied Catalysis B, Journal of Agriculture and Food Chemistry, Chemosphere, and Journal of Hazardous Materials. She has received three research grants from the U.S. National Science Foundation as the single PI. In addition, Dr. Zhang directed research projects for PennDOT, William Penn Foundation, NSF WET Center, USGS through PA-WRRC and PA Sea Grant, and Research Corporation.

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