Mar 13th, 4:00 PM - 5:00 PM

Heterogeneous Photo-Fenton Reactions and Hybridization with Ceramic Membrane Filtration

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MONTCLAIR STATE UNIVERSITY

The MSU Sustainability Seminar Series Presents:

Heterogeneous Photo-Fenton Reactions and Hybridization with Ceramic Membrane Filtration

WHEN: March 13, 4:00 pm
WHERE: CELS 120 lecture hall

Dr. Wen Zhang
New Jersey Institute of Technology

Wen Zhang is an associate professor of NJIT's Newark College of Engineering in the Department of Civil and Environmental Engineering. Wen is a licensed Professional Engineer (P.E.) registered in the States of New Jersey and Delaware. He is an American Academy of Environmental Engineers and Scientists (AAEES) Board Certified Environmental Engineer (BCEE). His research focuses on environmental nanotechnology, visible light-driven photocatalytic processes, nanomaterials for antimicrobial applications and reactive membrane filtration systems.

Various emerging organic micropollutants potentially threat drinking water security and human health. Many traditional water treatment processes (e.g., adsorption) are either insufficient or not cost effective (e.g., reverse osmosis). Our research group has been working on various advanced oxidation processes including photocatalysis, electrochemical oxidation and photo-Fenton reactions to address the need to develop next-generation, scalable, and high efficient water treatment technologies. These technologies are particularly useful for point-of-use (POU) water treatment. This presentation will introduce our recent studies using heterogeneous photo-Fenton reactions to remove BPA and methylene blue (MB) as a model dye pollutant from water. Novel hybrid nanostructured composite catalysts were explored to overcome the limitations in traditional Fenton reactions (e.g., high doses of Fe^{2+}/Fe^{3+} and low working pH). For example, hematite (α-Fe_2O_3) nanoparticles were anchored to graphene oxide (GO) nanosheet (α-Fe_2O_3@GO) to evaluate the degradation or decolorization efficiency of MB under UV irradiation. Furthermore, we also integrate developed catalytic nanomaterials into membrane systems to enable multifunctional reactive membrane filtration. We have demonstrated: (1) the use of reactive membrane filtratoin to separate and oxidize potentially pathogenic microorganisms (e.g., algal cells and bacteria) in aqueous suspension; (2) Evaluation of the removal of antibiotic compound (sulfamethoxazole) and 1,4-dioxane; (3) fouling mitigation and development of antifouling strategies.