



Department of Civil & Environmental Engineering & Earth Science

EE/ES Series

September 30, 2019
120 DeBartolo Hall 4:00 p.m.-5:00 p.m.
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Title:

Manganese-based Oxidation of Emerging Contaminants: Environmental Transformation and Oxidative and Catalytic Removal in Advanced Water Treatment

Abstract:

Emerging contaminants (ECs) are a growing concern for water treatment as their presence in the environment continues to grow. Examples of ECs include pharmaceutical and personal care products (PPCPs), endocrine disrupting chemicals (EDCs), fire retardants, and pesticides etc. Conventional water treatment processes were not designed to remove ECs and their removal efficiencies vary broadly from <50% to >80%. Among advanced treatment technologies, oxidation by Mn oxides (MnOx) or permanganate could be promising, as MnOx are one of the most important natural oxidants and permanganate is a widely used green oxidant. The focus of this work is to examine the reactivity of a large variety of natural and synthetic MnOx in degrading different ECs either as a direct oxidant or as a catalyst. The earlier work focused on understanding the reaction kinetics and mechanisms of four groups of ECs by natural MnOx. Then the oxidation of ECs in mixtures of MnOx and other second oxides was investigated to understand how the interactions between MnOx and the second oxides affected the oxidation of ECs. Recently, the focus has been on synthesizing a large range of MnOx and examining how the oxide structural and physicochemical properties affect their oxidative and catalytic reactivity.

Bio:

Dr. Huichun (Judy) Zhang is an associate professor in the Department of Civil Engineering at Case Western Reserve University. She earned her Ph.D. from Georgia Institute of Technology and her B.S. and M.S. from Nanjing University in China. Her research focuses on the fate and transformation of environmental contaminants in natural and engineered aquatic environments and the removal of organic contaminants from contaminated water. Dr. Zhang has published in numerous journals, such as Environmental Science and Technology, Water Research, Applied Catalysis B, Journal of Hazardous Materials, Environmental International, Chemical Engineering Journal, Journal of Physical Chemistry C, Langmuir, Chemosphere, and Journal of Agriculture and Food Chemistry. She has received **five** competitive research grants from the U.S. National Science Foundation as the PI. In addition, Dr. Zhang directed research projects for the USEPA, PennDOT, William Penn Foundation, Lubrizol, NSF WET Center, USGS through PA-WRRC and PA Sea Grant, and Research Corporation. She is an Associate Editor for Environmental Research, Frontiers of Environmental Science and Engineering (FESE), and Journal of Environmental Engineering (ASCE).