

Department of Chemical and Environmental Engineering

2015—2016 Seminar Series

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9:30-10:30am

Winston Chung Hall 205/206



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Treatment of Emerging Contaminants in Wastewater Using Advanced Materials

Various emerging contaminants include endocrine disrupting compounds, pharmaceutical compounds and personal care products. The emerging contaminants released from municipal, agricultural and industrial wastewater contaminate significant amount of groundwater, surface water and various water resources. These contaminants exhibited their lethal effects on human health at ultra-low level (ng/L to $\mu\text{g/L}$) causing infertility, breast cancer, thyroid cancer and prostate cancer. Untreated emerging contaminants can pose serious risks to human health and the environment when treated wastewater is reused for agricultural and manufacturing industries.

To develop effective treatment and reuse of wastewater containing emerging contaminants, the integrated process of adsorption, photocatalytic and catalytic oxidations using advanced materials were suggested. The integrated process relied on “advanced materials” that were the carbon-supported photocatalysts and catalysts (i.e., biochar-supported TiO_2 or CuS , carbon nanotube-supported iron oxides). The carbon-supported photocatalysts and catalysts were prepared, characterized and evaluated. The integrated processes using the advanced materials showed rapid adsorption and effective oxidation of target endocrine disrupting compound (bisphenol A) and antibiotics (Sulfamethoxazole, SMX) in wastewater. The integrated processes resulted in complete removal of target contaminants, high mineralization, and negligible biotoxicity/estrogenic activity. The proposed process will effectively remove these contaminants from wastewater, and reuse the treated wastewater to agricultural irrigation and other industries while leading to cost-effective removal of endocrine disrupting compounds, pharmaceutical drugs and microbial pathogens in reclaimed wastewater.

Bio: Dr. Eunsung Kan obtained the Ph.D. in chemical and environmental engineering from the University of California at Riverside. He had his postdoctoral research at U.S. Environmental Protection Agency. After his postdoc research, he worked as an assistant professor in chemical engineering at United Arab Emirates University in United Arab Emirates. He is currently an assistant professor in biological engineering at the University of Hawaii at Manoa. His research areas include advanced wastewater and water treatment, sustainable water treatment and production of biofuels from wastes.