



# CHE SEMINAR SERIES

## Environmental processes for water treatment and resource recovery in water and wastewater

**CHANGSEOK HAN, PH.D.**

Due to increased anthropogenic activities on the Earth, there are many chances to find different recalcitrant micropollutants in the environment. In particular, many studies have frequently reported the presence of toxins, pesticides, pharmaceuticals and personal care products, and synthetic chemicals, known as contaminants of emerging concern, in the environment as well as their adverse effects on the health of humans, animals, and the ecosystem. Therefore, it is of great importance to develop reliable technologies for decomposing different refractory contaminants in water and wastewater. Moreover, ammonia as a hydrogen carrier has gained much attention in hydrogen industry since ammonia could contain 3 or 4 hydrogens, depending on its speciation. Ammonia is usually produced via the Haber-Bosch process for different industries. However, as estimated, the process may consume 2% of the world's total energy consumption. Interestingly, an effluent in an environmental public infrastructure, i.e., anaerobic digesters, contains much ammonia as ammonium above 1,000 mg/L and 300,000 tons of ammonia are annually released into the environment from typical domestic wastewater treatment facilities. Therefore, it is a great interest to collect the useful resources, ammonium, from wastewater treatment plants. In this presentation, radical-based water treatment processes will be introduced and discussed for decomposing recalcitrant pollutants. Moreover, the application of electrodialysis will be presented for ammonium recovery in leachates from an anaerobic digestion sludge effluent.

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Changseok Han is an Associate Professor in Department of Environmental Engineering at the INHA University, South Korea. Currently, Prof. Han is a Fulbright visiting scholar at the Center for Environmental Solutions & Emergency Response in the US Environmental Protection Agency. He is an Editor of Separation and Purification Technology and an Associate Editor of Process Safety and Environmental Protection. Prof. Han earned my PhD in Environmental Science and Engineering Program at the University of Cincinnati and was an ORISE Postdoctoral Research Fellow at the U.S. Environmental Protection Agency, Cincinnati, OH, USA. His research interests are (i) Water treatment using advanced oxidation processes, (ii) Environmental nanotechnologies, (iii) Nutrient and resource recovery in surface water and wastewater, and (iv) Monitoring and degradation of microplastics.

