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Electrified filter for sustainable water treatment and reuse

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Seminar Details

Friday,Oct 10, 2025
2:30pm – 4:00pm

UH Campus
Classroom & Business Building
Room CBB 104

Online via Teams https://www.cive.uh.edu/research/beyer-distinguished-lecture

ABSTRACT: With rising demand for decarbonization and increased focus on sustainability, energy-efficient precise water treatment technologies have become critical in industrial and municipal applications. Selective removal of priority pollutants enables fit-for-purpose treatment while minimizing the wastage of treatment capacity. At the same time, waste streams can be mined for valuable products, such as nutrients and precious metals, requiring highly selective processes to extract or transform target solutes from complex matrices. In this talk, I will introduce the design and application of titanate nanowire filters for fast, effective, and low-cost electrooxidation. The ultrathin and porous nanowire network functions as an active layer for electrocatalytic reactions without blocking the mass transfer through the filter. This innovative electrified filter would realize a simple and flexible decentralized water treatment platform. In addition, I will discuss the development of pulsing strategies to dynamically regulate interfacial processes, control reaction pathways, and enhance catalyst selectivity and stability. Overall, this talk will highlight how to combine fundamental understandings, material innovation, and process optimization for sustainable water treatment and reuse.

BIOGRAPHY: Dr. Wensi Chen is an assistant professor in the Zachry Department of Civil and Environmental Engineering at Texas A&M University. Her research group focuses on the design, development, and applications of functional materials and novel processes to address global challenges related to water, energy, and health. Before joining Texas A&M, Dr. Chen was a postdoctoral associate in the Department of Chemical and Environmental Engineering at Yale University (2022-2023). She received her Ph.D. in Environmental Engineering from Georgia Institute of Technology in 2022 and B.S. in Chemistry from Tsinghua University in 2017. Her research work has earned recognition including the Jean-Lou Chameau Research Excellence Award, Georgie Tech Best CEE Ph.D. Thesis Award, Sigma Xi Best Ph.D. Thesis Award, ES&T Best Paper Award, and TWRI Faculty Fellowship. She also serves on the Early Career Editorial Advisory Board for ES&T journal.