Mar 6, 2026

Enabling Nitrogen Recovery from Drinking and Wastewater Using Electrochemical Methods

Beyer Distinguished Lecture

Dr. Charles Werth

Professor and Bettie Margaret Smith Chair
Environmental Health Engineering
University of Texas at Austin

Seminar Details

2:30-4:00pm

UH Campus
Classroom & Business Building
Room CBB 110

Online via Teams
https://teams.microsoft.com/meet/28672503493418?p=0CX16bX3BZZ6J5ss6O

ABSTRACT

Each year greater than 1% of the total U.S. energy demand is used to produce approximately 15 million metric tons (Mt) of ammonia, and approximately 13 Mt of this is used in agricultural fertilizers. Greater than 50% of the 13 Mt is taken up by crops, but the remainder is lost to the atmosphere as nitrous oxide or to streams and groundwater as nitrate. Nitrous oxide is a potent greenhouse gas, while nitrate contributes to both methemoglobinemia and cancer and must be removed to below the regulatory limit of 44 mg/L in drinking water. This talk will focus on our efforts to develop a new electrochemical technology to convert nitrate in drinking water or ion exchange waste brines to ammonia for recovery in order to reduce energy needs for the Haber-Bosch process. Advancements in both cathode and reactor design that enhance nitrate reduction activity, selectivity for ammonia, and Faradaic efficiency, and minimize mass transfer limitations and energy demands, will be addressed.

BIOGRAPHY

Dr. Charles Werth is a Professor and the Bettie Margaret Smith Chair in Environmental Health Engineering in the Maseeh Department of Civil, Architectural and Environmental Engineering at the University of Texas at Austin. Dr. Werth's research and teaching background includes fundamental and applied studies on pollutant fate and treatment in both natural and engineered water systems, with applications in electrocatalytic drinking water treatment, in situ groundwater remediation, and geological carbon sequestration. Dr. Werth received his B.S. in Mechanical Engineering from Texas A&M University, and M.S. and Ph.D. in Civil and Environmental Engineering from Stanford University.