Quantifying hydrated electron-based photochemical parameters during UV-advanced reduction processes

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Abstract
Chemical contamination of source waters threatens the continued provision of safe drinking water and the health of aquatic ecosystem based advanced reduction processes (UV-ARP), which are characterized by generation of the highly reducing hydrated electron (e\textsubscript{aq}⁻). While lab and pilot scale studies demonstrate that UV-ARP are capable of near-quantitative destruction of PFAS carbon-fluorine bonds, there is little information regarding the photochemical kinetics of the photoactive species, e\textsubscript{aq}⁻. In this talk, I will present my group’s efforts to develop methods for quantifying e\textsubscript{aq}⁻ photochemical parameters in UV-ARP, the insights that these methods afforded in UV-ARP treatment of perfluorooctane sulfonate in diverse source waters, and the role of different e\textsubscript{aq}⁻ scavengers, including carbonate species and dissolved organic matter.

Background
Dr. Garrett McKay joined the Zachry Department of Civil & Environmental Engineering at Texas A&M University in September 2019 as an assistant professor. His research focuses on chemical processes occurring in natural and engineered systems, including aquatic photochemistry, dissolved organic matter optical properties and characterization, and treatment of emerging contaminants. Before joining the faculty at TAMU, Dr. McKay was a postdoctoral scholar at The Colorado School of Mines. He graduated with his PhD in Environmental Engineering in 2017 from CU Boulder. His group has received external support from the National Science Foundation, Army Research Office, and Texas Hazardous Waste Research Center. Dr. McKay was a recipient of the 2021 Excellence in Review Award from Environmental Science & Technology.