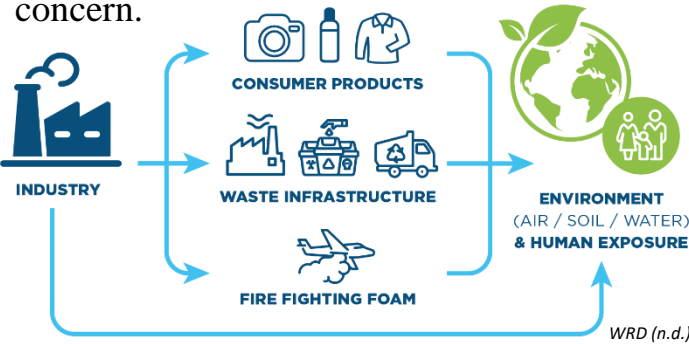


Introduction

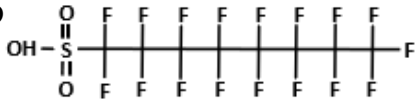
Per- and polyfluoroalkyl substances (PFAS) are a class of contaminants of emerging concern.



Human Health Effects:

Liver, immunological, developmental, endocrine, reproductive, cardiovascular

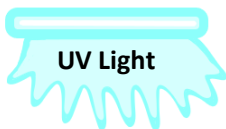
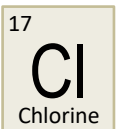
PFAS structures have carbon-fluorine chain with headgroup



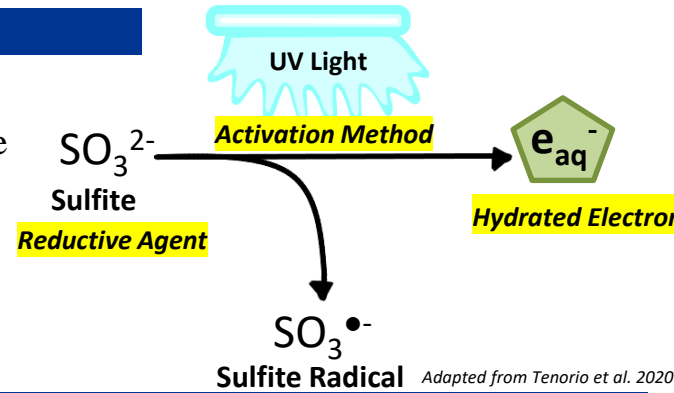
Short Chain & Long Chain

PFAS are resistant to conventional wastewater treatment technologies

Disinfection Process:



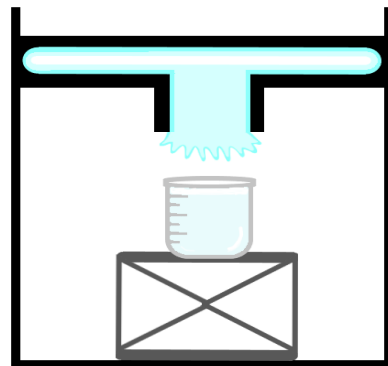
Advanced reduction processes (ARPs) have the potential to convert long chain PFAS into shorter chain PFAS.



Methods

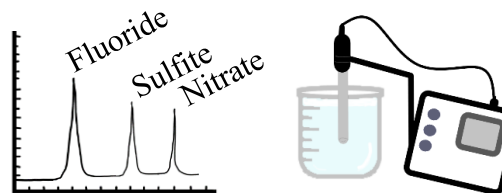
Experimental Setup

UV Collimated Beam Test



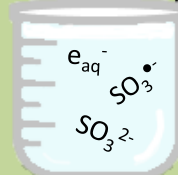
Analysis

Ion Chromatography
Oxidation Reduction Potential
pH, Dissolved Oxygen (DO)



Preliminary Experiments

Confirm reduction capabilities
Determine ideal sulfite dose
Familiarize with equipment



Primary Experiments

Include PFAS (e.g. PFOA, PFOS)
Commercial laboratory analysis
Measure fluoride ions



Research Questions

- Do common WW treatment tools, like UV and sulfite, have further potential for addressing contaminants of emerging concern?
- Is the UV/sulfite ARP viable for PFAS transformation/degradation under more realistic wastewater conditions than previously studied?

Work Expansion

- Scavenging species
 NO_3^- DO NOM
- Wastewater from local facilities
- Other UV wavelengths
 $\lambda = 222 \text{ nm}$
- Pharmaceuticals & personal care products (PPCPs)

Sources & Acknowledgements

Botlaguduru, V. S. V. (2016). UV-Sulfite Based Advanced Reduction Treatment of Disinfection Byproducts and Perfluorooctanoic Acid. [Doctoral dissertation, Texas A&M University]. https://oaktrust.library.tamu.edu/bitstream/handle/1969.1/157150/BO_TLAGUDURU-DISSERTATION-2016.pdf?sequence=1&isAllowed=y

Tenorio, R., Liu, J., Xiao, X., Maizel, A., Higgins, C., Schaefer, C., & Strathmann, T. (2020). Destruction of Per- and Polyfluoroalkyl Substances (PFASs) in Aqueous Film-Forming Foam (AFFF) with UV-Sulfite Photoreductive Treatment. *Environmental Science & Technology*, 6957-6967.

Water Replenishment District (WRD). (n.d.). PFAS Resources. Retrieved from WRD: <https://www.wrd.org/content/pfas-resources>