

Advanced Oxidation Processes

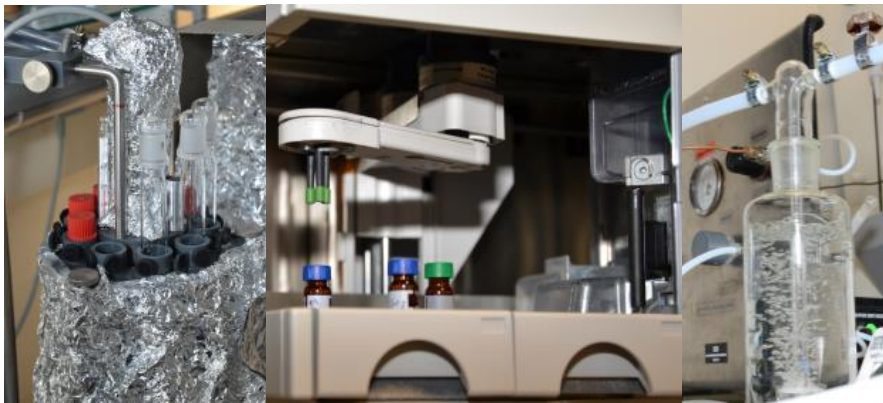
Investigation of fundamental mechanisms in oxidative water treatment processes (e.g., ozonation, Fenton, chlorine dioxide, photo-oxidation UV, UV/H₂O₂ and UV/S₂O₈²⁻)

Studies on reaction pathways in pollutant degradation and by-product formation

Development and critical assessment and of new oxidants and applications for pollutant degradation

Optimization of oxidative drinking- and wastewater treatment processes

Development of oxidation modules for analytical processes (e.g., stable isotope analysis)



Physical procedures as Advanced Oxidation Processes (AOP) for water treatment

In order to develop a Plasma-based technology for the degradation of recalcitrant organic compounds in water the following topics are in the focus of our studies.

- Generation of electrical discharges in water
- Plasma diagnostics
- Degradation Efficiency

Electrical discharges in water are generated by applying pulsed high voltage and pulsed microwaves. Therefore, pulse generator and plasma reactor have to be developed (AiF-ZIM, AiF-IGF funding). Plasma diagnostics is performed by means of optical methods, optical discharge imaging and emission spectrometry (DFG funding). In order to prove the applicability of underwater electrical discharges for water treatment pharmaceutical substances and perfluorinated compounds

have been selected for the investigation of removal rates and studies on possible generation of by-products (EU funding).

Furthermore, the combination of a boron-doped diamond electrode with a condensator module for preconcentration and subsequent degradation of the recalcitrant contaminants (PFOA; PFOS) is investigated (AiF-ZIM funding).