Abstract Submitted
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Proof of concept for irradiation breakdown if PFOS via electron beam[1] RUILIAN GAO, ROBERT RODI, JOHN LASSALLE, CORINNE KOWALD, MINGBAO FENG, Plasma Engineering and Non-equilibrium Processing Laboratory at Texas A&M University, SURESH PILLAI, National Center for Electron Beam Research at Texas A&M University, DAVID STAACK, Plasma Engineering and Non-equilibrium Processing Laboratory at Texas A&M University — Perfluorooctanesulfonic acid, known as PFOS, is a suspected carcinogen found in global waters and soils. It is very difficult to breakdown as a result of the carbon-fluorine bonds. Toxicity and bioaccumulation of PFOS have been verified by several studies. Rising concerns and inadequate solutions led to the belief that electron beam treatment may be a cost effective and efficient way to destroy PFOS in water. This study uses 10 MeV, 15kW electron beam to process aqueous PFOS solution spiked to concentrations of 10 g/L, sand samples spiked to concentration of 20mg/kg, and field samples from Texas, Michigan, Pennsylvania. Previous research shows that NaOH, NaHCO3, and NaNO3 aid in the breakdown of PFOS at low doses. Preliminary results show a greater than 48.6% PFOS level breakdown for water samples without laboratory additives under the ebeam at 500 and 2000 kGy absorbed dose, and that additives are detrimental in the reduction of PFOS at higher doses. Irradiated sand samples, without additives, show greater than 99% PFOS breakdown at the doses of 500 and 2000 kGy. This research adds upon previous work and hopes to introduce insight on the topic including single run high dosing, additive testing, and condensation recovery.

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