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Summary: A new student was hired on this project and has spent time learning the experimental setup and appropriate methods. In addition, a new catalytic reactor, which was developed on another project will be tested in Q2 for the degradation or PFAS in controlled samples and electroplating wastewater. Initial results for the oxidation of PFOA with this catalyst are shown below.

Results: Figure 1 shows that concentration profile of PFOA at different potentials using three different catalysts: (1) a SnO_2 catalyst deposited by electrodeposition followed by thermal oxidation (EDT) (i.e., SnO_2-EDT/REM), (2) a Bi_2O_3 catalyst deposited by EDT (i.e., Bi_2O_3-EDT/REM), and (3) two Bi_2O_3-SnO_2 catalyst (BTO) deposited by EDT (i.e., BTO-EDT/REM). At 4.2 V/SHE, 42.4 ± 15.3%, 41.4 ± 2.6%, 59.0 ± 4.1% and >90% removal of PFOA was observed using SnO_2-EDT/REM, Bi_2O_3-EDT/REM, BTO-EDT/REM-2, and BTO-EDT/REM-1, respectively. Overall, the results showed higher removal of PFOA for SnO_2-EDT/REM compared to Bi_2O_3-EDT/REM. However, we observed that SnO_2 was leaching into the permeate solution at potentials ≥ 3.7 V/SHE. From concentration profiles for BTO-EDT/REMs, it can be observed that presence of Bi_2O_3 improves removal of PFOA. We hypothesize that, Bi_2O_3 stabilizes SnO_2.

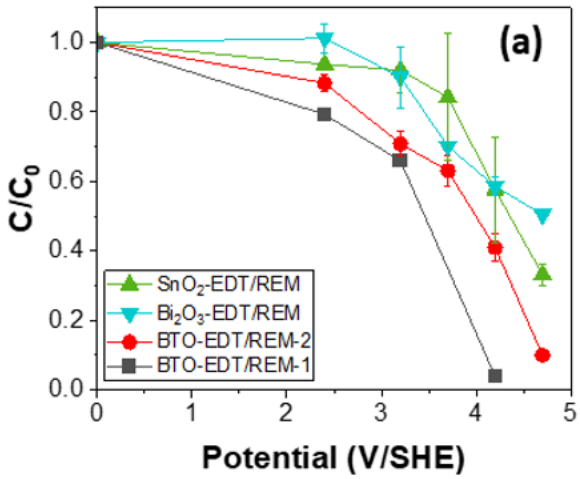

Figure 1: C/C_0 profile of PFOA (C_0 = 100 μM) as a function of potential.