Destruction of EDTA-Metal Complex in Supercritical Water

이인구*, 하종현, 황경란
한국에너지기술연구원
(samwe04@kier.re.kr*)

EDTA (ethylendiaminetetraacetic acid) is a representative reagent used in chemical cleaning processes to eliminate metals attached on the reactors, steam generators, or pipe lines, which leads to the reduction in heat transfer efficiency. Chemical cleaning processes result in the generation of wastewater consisting of EDTA-metal complexes that are resistant to biodegradation. In this work, the destruction of EDTA-Fe metal complex was carried out in supercritical water at a wide temperature range of 380-660^{o}C, 28MPa, and LHSVs of 20-60 h^{-1}. The destruction of EDTA-Fe metal was about 10% under sub-critical water conditions at 350^{o}C and increased rapidly with increasing temperature to 42% at 400^{oC} and near 100% at 420^{o}C and a LHSV of 60 h^{-1}. Reactor residence time over the range examined did not affect the complex destruction, which is an encouraging result because higher destruction rate leads to more economical process. The COD and TOC destructions increased with increasing temperature from 22% at 380^{o}C to about 80% at 575^{o}C at a LHSV of 60 h^{-1}. Almost all of the nitrogen in EDTA reagent was converted to ammonia during the supercritical water treatment.