**Removal of bisphenol A in water by sulfate radical-based advanced oxidation process**

Wen-Da Oh1,2, Teik-Thye Lim1,2 Zhili Dong1,3

1 Nanyang Environment and Water Research Institute (NEWRI), Interdisciplinary Graduate School, Nanyang Technological University, 1 Cleantech Loop, CleanTech One Singapore, 637141, Singapore, woh001@e.ntu.edu.sg.

2 Division of Environmental and Water Resources Engineering, School of Civil and Environmental Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798, Singapore.

3 School of Materials Science and Engineering, Nanyang Technological University, 50 Nanyang Avenue, Singapore 639798, Singapore.

Sulfate radical-based advanced oxidation technology (SR-AOT) is increasingly becoming popular as an eco-friendly and effective method for emerging contaminant abatement. SR-AOT employs reactive sulfate radical to degrade recalcitrant organics. Sulfate radical can be efficiently generated from heterogeneous transition metal activation of commercially-available oxidants, namely persulfate and peroxymonosulfate. Herein, process optimization and chemical transformation of catalytic oxidation of bisphenol A (BPA) by sulfate radical using CuFe2O4-Fe2O3 as the catalyst was investigated. The catalyst was prepared using an eco-friendly, low temperature co-precipitation method. The effects of several operational parameters, namely catalyst loading, peroxymonosulfate dosage and initial pH on the rate and removal efficiency of BPA were studied. The results indicated that the influence of the operating parameters increased in the following order: peroxymonosulfate dosage < catalyst loading < initial pH. Evaluation of the relative contributions of sulfate radical and hydroxyl radical during BPA degradation at various initial pHs (4.5, 7.0 and 9.5) was also conducted giving insights to the BPA degradation pathway which have profound influence on the acute toxicity of the treated water. The chemical transformation of BPA at various pH suggest that the major pathways could be dependent on the initial reaction pH attributed to the kinetically-favourable transformation of sulfate radicals to hydroxyl radicals at basic pH. Generally, the remarkable performance of the SR-AOT provides a potential low-cost platform for the treatment of hydrophobic pollutant such as bisphenol A.

Keywords: Sulfate radical; Bisphenol A; CuFe2O4-Fe2O3; Hydrophobic.