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Manganese doping ordered mesoporous Co_3O_4 as heterogeneous peroxymonosulfate activator for the degradation of bisphenol A

Jing Deng[a,b], Yongjian Ge[b], Xiaoyan Ma[b], Shanfang Feng[b], Yijing Chen[b], Yongqing Cheng[b], Hongyu Wang[b,*]

[a]*College of Civil Engineering and Architecture, Zhejiang University, Hangzhou 310058, China*
[b]*College of Civil Engineering and Architecture, Zhejiang University of Technology, Hangzhou 310014, China, Tel./Fax: +86 571 88320180; email: hywangzjut@163.com (H. Wang)*

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ABSTRACT

A novel catalyst, Co_3O_4–$CoMn_2O_4$ in which manganese was doped into ordered mesoporous Co_3O_4, was synthesized and used as peroxymonosulfate (PMS) activation for the degradation of bisphenol A (BPA) in water. The effects of Co_3O_4–$CoMn_2O_4$ dose, PMS concentration, solution pH, temperature and anions were also investigated. Results showed that higher catalyst loading, PMS concentration and reactive temperature would accelerate the BPA degradation, and Co_3O_4–$CoMn_2O_4$ had a wide pH range in the activation of PMS. Cl^- and $H_2PO_4^-$ could favor the BPA removal, whereas, NO_3^-, HCO_3^- and SO_4^{2-} would inhibit it. Sulfate radicals were confirmed to be the major active species in the heterogeneous system through radicals quenching experiments. Catalytic activity in PMS solution was remained after five consecutive runs. Due to its lower toxicity and cost, Co_3O_4–$CoMn_2O_4$ should be a promising catalyst applied in curbing environmental pollution.

Keywords: Co_3O_4–$CoMn_2O_4$; Peroxymonosulfate; Bisphenol A; Degradation; Sulfate radicals

* Corresponding author.