Manganese doping ordered mesoporous Co$_3$O$_4$ as heterogeneous peroxymonosulfate activator for the degradation of bisphenol A

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**ABSTRACT**

A novel catalyst, Co$_3$O$_4$–CoMn$_2$O$_4$ in which manganese was doped into ordered mesoporous Co$_3$O$_4$, was synthesized and used as peroxymonosulfate (PMS) activation for the degradation of bisphenol A (BPA) in water. The effects of Co$_3$O$_4$–CoMn$_2$O$_4$ 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$_3$O$_4$–CoMn$_2$O$_4$ had a wide pH range in the activation of PMS. Cl$^-$ and H$_2$PO$_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$_3$O$_4$–CoMn$_2$O$_4$ should be a promising catalyst applied in curbing environmental pollution.

**Keywords:** Co$_3$O$_4$–CoMn$_2$O$_4$; Peroxymonosulfate; Bisphenol A; Degradation; Sulfate radicals