

## Construction of Fe<sub>3</sub>O<sub>4</sub>/FeP Binary Composite Catalyst for Degradation of Tetracycline in Wastewater

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The abuse of antibiotics greatly aggravates water pollution. Tetracycline hydrochloride (TC), has been widely used all over the world as a typical antibiotic. In order to dispose of TC, a series of Fe<sub>3</sub>O<sub>4</sub>/FeP composite materials were synthesized with the combination of hydrothermal synthesis and partial phosphating annealing method. Meanwhile, the morphology and structural characteristics were investigated using characterization such as diffraction of X-rays (XRD), scanning electron microscope (SEM), transmission electron microscopy (TEM), electro-chemical impedance spectroscopy (EIS) etc. The dark adsorption and photocatalytic activity of Fe<sub>3</sub>O<sub>4</sub>/FeP were investigated comprehensively to remove the target molecule tetracycline. Results indicated that Fe<sub>3</sub>O<sub>4</sub>/FeP catalysts have a superior performance on dark adsorption, and good effect of TC degradation. Among synthesized photocatalysts, Fe<sub>3</sub>O<sub>4</sub>/FeP-6 (molar ratios of Fe:P at 1:6) possessed the optimized performance in adsorption capacity and photodegradation efficiency (88%) comparing to the other ratios. Furthermore, the stability and reusability of Fe<sub>3</sub>O<sub>4</sub>/FeP-6 ensured the cyclic photocatalysis experiment. This synthesized catalyst has proved its potential application in wastewater treatment.

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**Keywords:** Fe<sub>3</sub>O<sub>4</sub>/FeP; photodegradation; tetracycline hydrochloride; in-situ partial phosphating.

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