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Preparation of heterogeneous Fenton catalyst Fe/organo-attapulgite and its performance in sodium humate degradation

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ABSTRACT

A novel heterogeneous Fenton catalyst Fe/organo-attapulgite (Fe/OATP) was prepared by introducing nano-Fe into organic modified attapulgite with redox method. The new catalyst was characterized by XRD, IR and SEM, and a series of experiments were conducted for investigating the influences of pH value, catalyst dosage, hydrogen peroxide concentration, reaction temperature and initial concentration of HA-Na solution on the degradation ratios of HA-Na in Fe/OATP/H_2O_2 heterogeneous Fenton system. Through a number of degradation experiments under various conditions, the results showed that the removal ratio of HA-Na can reach more than 97% at the condition of pH value 8, the reaction temperature 70°C, the initial HA-Na concentration 100 mg/L, the catalysts dosage 10 g/L, and the H_2O_2 concentration 78.4 mmol/L. According to the results of dynamics experiments, the degradation of HA-Na followed the first-order kinetics. Fe/OATP catalyst has a wide pH range in heterogeneous Fenton reaction and can be reused for many runs with good capacity of HA-Na degradation.

Keywords: Attapulgite (ATP); Heterogeneous Fenton catalyst; Degradation; HA-Na

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