



## FeNi<sub>3</sub>@SiO<sub>2</sub> magnetic nanocomposite as a highly efficient Fenton-like catalyst for humic acid adsorption and degradation in neutral environments

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### ABSTRACT

In this research, the ability of Fenton-like catalytic process in the presence of H<sub>2</sub>O<sub>2</sub> for degradation of humic acid in simulated water was studied. In this regard, FeNi<sub>3</sub> nanoparticles were synthesized by the coprecipitation method, using SiO<sub>2</sub>. The properties of the prepared FeNi<sub>3</sub>@SiO<sub>2</sub> were assessed using Fourier transform infrared spectroscopy, vibrating sample magnetometer, field-emission scanning electron microscopy and transmission electron microscopy. The studied parameters were pH (3, 5, 7, 9 and 11), contact time (5–180 min), nanocomposite dose (0.005–0.1 g/L), concentration of humic acid (2–15 mg/L) and concentration of H<sub>2</sub>O<sub>2</sub> (50–200 mg/L). The highest removal percentage of humic acid was 100% at pH = 7, with humic acid concentration of 10 PPM, FeNi<sub>3</sub>@SiO<sub>2</sub> dosage of 0.1 g/L and H<sub>2</sub>O<sub>2</sub> dosage of 200 mg/L. According to the results, the Fenton-like catalytic process of FeNi<sub>3</sub>@SiO<sub>2</sub>/H<sub>2</sub>O<sub>2</sub> had high efficiency in removing humic acid from aquatic environment.

*Keywords:* FeNi<sub>3</sub>@SiO<sub>2</sub> magnetic nanoparticles; Humic acid; Catalyst; Fenton-like; Advanced oxidation process

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