

## عنوان مقاله:

Investigation and Comparison of Cobalt ferrite composite nanoparticles with individual Iron oxide and Cobalt oxide nanoparticles in azo dyes removal

## محل انتشار:

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## خلاصه مقاله:

Photocatalytic treatment of wastewater from azo dyes with semiconductors promises efficient method to refine water. Cobalt ferrite is synthesized and utilized for dye removal as a semiconducting composite. To compare photocatalytic performance of its individual oxides, cobalt oxide and iron oxide were synthesized by the same route and applied to water treatment. In this work, cobalt ferrite, cobalt oxide and iron oxide nanoparticles were synthesized as photocatalysts by employing wet chemical method with chloride precursors respectively ( $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  &  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ ,  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ ,  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ ). The synthesized photocatalysts were characterized by powder X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), diffuse reflectance spectroscopy (DRS) and field emission scanning electron microscopy (FESEM). The obtained photocatalysts were coated on glass by Dr Blade method. The degradation of Acid Black 1 (AB1) and Reactive Red 4 (RR4) by cobalt ferrite, cobalt oxide and iron oxide was carried out under UV light irradiation to investigate their photocatalytic activities. FeO nanoparticles were found as the best photocatalyst to achieve maximum degradation of Azo dyes. The high degradation performance of FeO can be attributed to photo-Fenton phenomena-like furthermore photocatalytic process. The Degradation rate of AB1 by photocatalysts decreases in the order of  $\text{FeO} > \text{Co}_3\text{O}_4 > \text{CoFe}_2\text{O}_4$ . The photocatalytic degradation kinetics of AB1 using photocatalyst nanoparticles was found to be the first order kinetic rate. For RR4,  $\text{CoFe}_2\text{O}_4$  followed first order, FeO and  $\text{Co}_3\text{O}_4$  followed second order kinetic rate. Presence of iron oxide in cobalt ferrite improved the photocatalytic performance.

## کلمات کلیدی:

Photo-Fenton phenomena, Photocatalytic degradation, kinetic, azo dye, Nanoparticle

## لینک ثابت مقاله در پایگاه سیویلیکا:

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