

## Comparative Catalytic Activity of Some Ferrites for Phenol Degradation in Aqueous Solutions

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**Abstract :** The treatment of wastewater from highly toxic pollutants is one of the most challenging issues for humanity. In this study, the advanced oxidation process (AOP) was employed to study the catalytic degradation of phenol using different ferrite catalysts which are  $\text{CoFe}_2\text{O}_4$ ,  $\text{CrFe}_2\text{O}_4$ ,  $\text{CuFe}_2\text{O}_4$ ,  $\text{MgFe}_2\text{O}_4$ ,  $\text{MnFe}_2\text{O}_4$ ,  $\text{NiFe}_2\text{O}_4$  and  $\text{ZnFe}_2\text{O}_4$ . The ferrite catalysts were prepared via sol-gel and co-precipitation methods. Different ferrite composites were also prepared either by varying the metal ratios or incorporating chemically reduced graphene oxide in the ferrite cluster. The effect of phosphoric acid treatment on the copper ferrite activity. All of the prepared catalysts were characterized using infrared spectroscopy (IR), X-ray diffraction (XRD) and scanning electron microscopy (SEM). The ferrites catalytic activities were tested towards phenol degradation using high performance liquid chromatography (HPLC). The experimental results showed that ferrites prepared through sol-gel route were more active than those of the co-precipitation method towards phenol degradation. In both cases,  $\text{CuFe}_2\text{O}_4$  exhibited the highest degradation of phenol compared to the other ferrites. The photocatalytic properties of the ferrites were also investigated.

**Keywords :** ferrite catalyst, ferrite composites, phenol degradation, photocatalysis

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