

## **Photodegradation of chlorophenoxyacetic acids by ZnO/ $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanocatalysts : a comparative study**

### **ABSTRACT**

ZnO/ $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanocomposite was synthesized via simple precipitation. The synthesized nanocatalysts underwent heat treatment at 450°C for an hour. The characteristics of the nanocomposite were investigated by XRD, TEM, and BET surface area measurement. Zeta potential analysis was used to examine the surface charge properties of the nanocatalysts. The synthesized nanocomposite has an average particle size of 11 nm and a surface area of 20 m<sup>2</sup> g<sup>-1</sup>. The potential of ZnO/ $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> as a photocatalyst was evaluated by photodegrading chlorophenoxyacetic acids (PAA, 2,4-D, 2,4,5-T and 4CA). The decomposition of chlorophenoxyacetic acids by ZnO/ $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> followed 4CA > 2,4,5-T  $\approx$  2,4-D > PAA. The result indicates the applicability of ZnO/ $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanocomposite as a photocatalyst in removing organic pollutants in wastewater.

**Keyword:** Photocatalytic degradation; Precipitation; Zinc oxide; 2,4-D