



## Synthesis and characterization studies on the degradation of Rhodamine B from aqueous solution by Cu-NiO/AC nanocomposites

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### ABSTRACT

Using the novel reflux-thermal method, a novel nanocomposite was prepared from activated carbon of *Zea mays* L. waste with copper-nickel-oxide (ZMCN). Nickel sulfate ( $\text{NiSO}_4$ ) and copper sulfate ( $\text{CuSO}_4$ ) were used as metal sources with  $\text{NaBH}_4$  and  $\text{NaOH}$  as a precursor. The composite was characterized by Brunauer–Emmett–Teller, Fourier-transform infrared spectroscopy (FT-IR), X-ray diffraction (XRD), scanning electron microscopy (SEM), high-resolution transmission electron microscopy, and thermogravimetric analysis/differential thermal analysis. The morphological characteristics of the synthesized ZMCN have been characterized using SEM. The XRD analysis showed the crystalline nature of ZMCN nanocomposite. In addition, FT-IR and energy-dispersive X-ray spectroscopy analyses were also carried out to investigate the particle size, chemical functional group, and elemental composition of ZMCN. The ZMCN was subsequently used for the dye degradation of Rhodamine B (RhB) at room temperature. RhB degradation was found to be 98.7% in 50 mg/L solution.

**Keywords:** Copper-nickel-oxide; Rhodamine B; Dye degradation; Catalyst

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