Preparation of Semiconductor Zinc Oxide Nanoparticles as a Photocatalyst to Get Rid of Organic Dyes Existing Factories in Exchange for Reuse in Suitable Purpose

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A new photocatalyst zinc(II) oxide (ZnO) was synthesized using a microwave-assisted green method using *p*-hydroxybenzoic acid and zinc nitrate as precursors. The sample was characterized by FTIR, UV-visible, EDX, XRD, SEM and TEM techniques. The molecular formula of the primary precursor $[\text{Zn}_2(\text{C}_7\text{H}_5\text{O}_3)_2(\text{NO}_3)_2(\text{H}_2\text{O})_4]$ binuclear zinc(II) complex was discussed using elemental analyses (CHN), FTIR, UV-visible, XRD, SEM and thermal analysis (TG). This new binuclear complex was formed with *p*-hydroxybenzoic acid as a bridged chelate connecting two zinc metal ions through the carboxylate groups. The chelation assignments declare that Zn(II) metals are coordinated to the *p*-hydroxybenzoate ligand with octahedral geometry. The photocatalytic property of the ZnO products was examined for the degradation of methyl red (MR), methyl orange (MO) and methylene blue (MB) solutions. The resulting data demonstrated a photocatalytic efficiency towards the removal of the selected organic dyes. The Electrical properties of ZnO NPs were measured within the temperature range 313-403 K.

Keywords: ZnO; precursors; organic dyes; XRD; TEM; photocatalyst; electrical properties.

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