

Photocatalytic Activity of Polypyrrole/ZnO Composites for Degradation of Dye Reactive Red 45 in Wastewater

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Abstract : Zinc oxide (ZnO) can be used as photocatalysts for water purification. However, one particular interest is given on the integration of inorganic ZnO nanoclusters with conducting polymers because the resulting nanocomposites may possess unique properties and enhanced photocatalytic activity in comparison to pure ZnO, using UV and also visible light. It is needed to explore the appropriate structure of polypyrrole that can induce activation of ZnO photocatalyst since the synthesis of organic/inorganic hybrid materials can result in a synergistic and complementary feature, increasing ZnO photocatalytic efficiency. In this paper several different composites of polypyrrole/zinc oxide (ZnO) were studied. Composite samples were characterized by X-ray powder diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), cyclic voltammetry (CV) and scanning electron microscopy (SEM). The photocatalytic efficiency of prepared samples was studied as a decomposition of Reactive Red 45 (RR 45) dye, which was monitored by UV-Vis spectroscopy as a change in absorbance of characteristic wavelength at 542 nm. Results show good photocatalytic efficiency of all nanocomposite samples.

Keywords : photocatalysis, polypyrrole, wastewater, zinc oxide

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