Preparation and photocatalytic activity of TiO$_2$/PPy/GO for the degradation of Rose Bengal and Victoria Blue dye in visible light in aqueous solution

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**Abstract**

This research work describes a proficient method for synthesis of TiO$_2$/PPy and TiO$_2$/PPy/GO nanocomposites. These nanocomposites were prepared by one-step in-situ deposition oxidative polymerization of pyrrole hydrochloride using ammonium persulphate as an oxidant in the presence of TiO$_2$ nanoparticles (NPs) cooled in an ice bath. The obtained nanocomposites were characterized by X-ray diffraction, transmission electron microscope, scanning electron microscope, UV-Visible, Brunauer–Emmett–Teller, and photoluminescence spectra techniques. The obtained results showed that TiO$_2$ NPs have been encapsulated by PPy with a strong effect on the morphology of TiO$_2$/PPy and TiO$_2$/PPy/GO nanocomposites. The photocatalytic degradation of Rose Bengal and Victoria Blue dyes were done at different condition viz. concentration of dye, time of illumination, pH, and dose of photocatalyst. The maximum photodegradation of dyes was found at 7 pH, 20 ppm concentration of Victoria Blue and 25 ppm of Rose Bengal dye solution, 800 mg/L for Victoria Blue dye (VB) and 1,600 mg/L for Rose Bengal dye (RB) amount of photocatalyst, and 120 min irradiation of visible light. Kinetics of photodegradation was investigated for VB and RB dye and found first-order kinetics.

**Keyword:** Photodegradation; Polymerization; Nanocomposites; Rose Bengal; Victoria Blue; Photocatalyst

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