

The Photocatalytic Degradation of Acid Blue 25 Dye by Polypyrrole/Titanium Dioxide and Polypyrrole/Zinc Oxide Composites

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Abstract : The composite preparation of titanium dioxide and zinc oxide photocatalysts with the conductive polymers gives the opportunity to carry out the catalysis reactions not only under UV light but also under visible light. Such processes may efficiently use sunlight in degradation of different organic pollutants and present new design for wastewater treatment. The paper presents the preparation procedure, material characteristics and photocatalytic efficiency of polypyrrole/titanium dioxide and polypyrrole/zinc oxide composites (PPy/TiO₂ and PPy/ZnO). The obtained composite samples were characterized by Fourier transform infrared spectroscopy (FTIR), UV-Vis spectroscopy and thermogravimetric analysis (TGA). The photocatalytic efficiency of the samples was determined following the decomposition of Acid Blue 25 dye (AB 25) under UV and visible light by UV/Vis spectroscopy. The efficiency of degradation is determined by total organic carbon content (TOC) after photocatalysis processes. The results show enhanced photocatalytic efficiency of the samples under visible light, so the prepared composite samples are recognized as efficient catalysts in degradation process of AB 25 dye. It can be concluded that the preparation of TiO₂ or ZnO composites with PPy can serve as a very efficient method for the improvement of TiO₂ and ZnO photocatalytic performance under visible light.

Keywords : composite, photocatalysis, polypyrrole, titanium dioxide, zinc oxide

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