

Rhodamine B Decomposition in Water Using Metal-Doped TiO₂ Photocatalysts supported on Zeolite or Nano-Graphite Substrates

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Rhodamine B is widely employed in the dyeing of paints, acrylics, textiles, and biological products, but its direct discharge into water can pose significant toxicity risks to organisms. This paper reports the findings on the degradation of Rhodamine B in water into environmentally benign products, using metal (Me)-doped TiO₂ (pure anatase) photocatalysts supported on zeolite or nano-graphite substrates. The TiO₂ synthesis process involved an innovative sol-gel technique combined with microwave treatment, leading in the production of highly pure anatase (TiO₂). These materials and involved processes demonstrate significant potential for purification of water from organic pollutants. Comprehensive materials characterization was conducted using Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Transmission Electron Microscopy (STEM), and X-ray Diffraction (XRD) techniques.