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### **Photocatalytic degradation of methylene blue on FeTiO<sub>3</sub>/TiO<sub>2</sub>/PbS heterojunctions**

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The photocatalytic activity of FeTiO<sub>3</sub>/TiO<sub>2</sub>/PbS catalysts on the degradation of methylene blue was evaluated under ultraviolet irradiation. The effects of pH, temperature, dissolved oxygen and different combinations of FeTiO<sub>3</sub>/TiO<sub>2</sub>/PbS on the degradation efficiency of methylene blue were investigated. Catalyst coated glass plates (35×60×3 mm) were irradiated with broadband UV light while they were dipped in 150 cm<sup>3</sup> of methylene blue aqueous solutions under constant (50 rpm) stirring. Catalyst coated glass plates were prepared by applying wetted catalysts, using distilled water or methanol over the glass plates uniformly and then sintering at 750 °C for 3 hours. Heterojunctions of catalysts were also prepared by the same procedure such that catalysts are coated over one another.

The photocatalytic activity of TiO<sub>2</sub> was the highest of the FeTiO<sub>3</sub>, PbS, and TiO<sub>2</sub> surfaces investigated. There was no considerable effect of temperature or air bubbling on the degradation of methylene blue either with any of the catalysts or with the heterojunctions. The pH variation between 5 and 7 also had no significant effect on the degradation of methylene blue. The degradation rate of methylene blue showed a higher value with the PbS surface. However, when PbS was combined with other catalysts i.e. FeTiO<sub>3</sub> and/or TiO<sub>2</sub>, a decline in the methylene blue degradation rate was observed. The results revealed that the optimum photocatalytic oxidation for methylene blue is with the FeTiO<sub>3</sub>/TiO<sub>2</sub> heterojunction under UV irradiation.