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Photocatalytic Degradation of Methylene Blue with Composite Nanocrystalline TiO₂+diatomite

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In this study photocatalytic activity of the prepared nano-sized TiO₂-based composite was tested by decolorisation/degradation of Methylene blue (MB) as a model pollutant under UV illumination. The composite was synthesized by a modified heterogeneous hydrolysis method in the presence of diatomite suspension by using TiCl₄ as titania precursor.

The photocatalyst was found to be very active for the photocatalytic decomposition of MB in aqueous solution. The percent decolorization in 60 min was 98% with initial MB concentration 53mg/L. The photocatalytic activity was correlated with physico-chemical properties of the synthesized materials. There is a synergistic effect of grafting titanium dioxide onto the surface of diatomite: the photocatalytic activity of TiO₂ dispersed on the diatomite surface was found to be much higher than of the bulk titania mainly due to the high surface area and uniform distribution of TiO₂ on clay mineral avoiding aggregation.