

Efficacy of TiO₂ in the Removal of an Acid Dye by Photo Catalytic Degradation

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Abstract : The objective of this work is to reduce the impact on the environment of an acid dye (Black Eriochrome T) using catalytic photo-degradation in the presence of the semiconductor powder (TiO₂) previously characterized. A series of tests have been carried out in order to demonstrate the influence of certain parameters on the degree of dye degradation by titanium dioxide in the presence of UV rays, such as contact time, the powder mass and the pH of the solution. X-ray diffraction analysis of the powder showed that the anatase structure is predominant and the rutile phase is presented by peaks of low intensity. The various chemical groups which characterize the presence of the bands corresponding to the anatase and rutile form and other chemical functions have been detected by the Fourier Transform Infrared spectroscopy. The photo degradation of the NET by TiO₂ is very interesting because it gives encouraging results. The study of photo-degradation at different concentrations of the dye showed that the lower concentrations give better removal rates. The degree of degradation of the dye increases with increasing pH; it reaches the maximum value at pH = 9. The ideal mass of TiO₂ which gives the high removal rate is 1.2 g/l. Thermal treatment of TiO₂ with the addition of CuO with contents of 5%, 10%, and 15% respectively gives better results of degradation of the NET dye. The high percentage of elimination is observed at a CuO content of 15%.

Keywords : acid dye, ultraviolet rays, degradation, photocatalyse

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