



Removal of aniline (Methylene Blue) and azo (Reactive Red 198) dyes by photocatalysis via nano TiO₂

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ABSTRACT

In the present study, a nano TiO₂ was used as a catalyst for the photocatalytic decolorization of Methylene Blue (MB) and Reactive Red 198 (RR198) dyes in the aqueous phase. Photocatalysis was optimized using a parametric study to improve the influence of different parameters such as catalyst dosage, pH effect, initial dye concentration, irradiation intensity for the degradation efficiency. The optimum conditions were determined as catalyst dosage= 0.25 g/L, pH = 6.5 and 9 and irradiation intensity = 50 W/m² for RR198 and MB. The color removals were 95% and 66% for RR198 and MB respectively. The efficient photocatalytic removal of selected dyes decreased with increasing initial dye concentration and increased with catalyst dosage, and also irradiation intensity. The pH effect varies the kind of dyes such as anionic and cationic. Kinetic data revealed that the decolorization was fitted by Langmuir-Hinshelwood model. The thermodynamic parameters showed that the process was feasible and exothermic. Using photocatalytic methods was a feasible choice for the removal of aniline and azo dyes.

Keywords: Methylene blue; Reactive red 198; Nano titanium dioxide; Photocatalytic decolorization

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