



Study the Activity of Titanium Dioxide Nanoparticle Using Crystal Violet Dye

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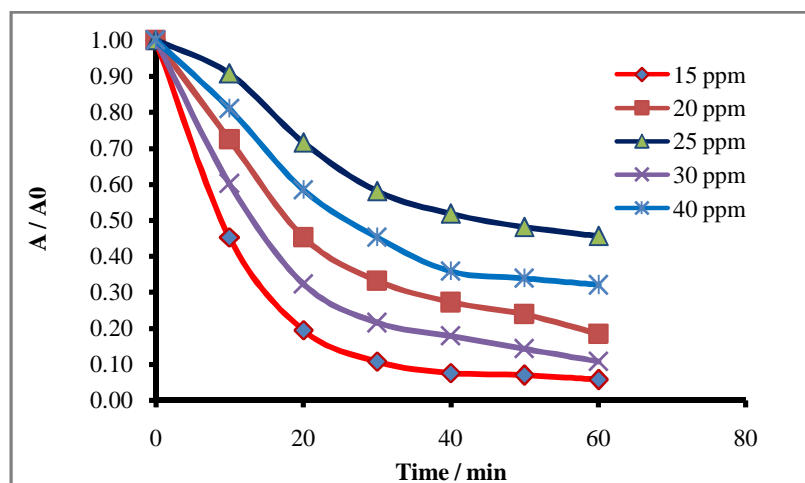
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ABSTRACT

In this study, titanium dioxide nanoparticles were used to photocatalyze the breakdown of the dye crystal violet. The factors tested included the quantity of photocatalyst, concentration of crystal violet dye, effect of light intensity, and influence of PH. At a titanium dioxide nanoparticle concentration of $0.14 \text{ g } 100 \text{ cm}^{-3}$ and a dye concentration of 15 ppm, the maximum photocatalytic degradation of crystal violet dye was noted. The pH 6.4 and 8.22 mW cm^{-2} light intensities were beneficial for the photocatalytic breakdown of crystal violet dye. The first order of reaction is followed by the photocatalytic breakdown of crystal violet dye. Different quantities of titanium dioxide nanoparticles suspended in an aqueous solution of crystal violet dye were exposed to 125 watts of UV radiation in a vessel reactor to study the photocatalytic degradation of crystal violet dye.

Graphical Abstract:



Effect of crystal violet dye concentration on photocatalytic degradation under UV irradiation, initial condition: amount of titanium dioxide nanoparticles = $0.14 \text{ gm}/100 \text{ cm}^3$ and pH = 6.4.

Keywords: Photo catalytic, semiconductor, TiO_2 , crystal violet dye.