

Solar Photocatalytic Degradation of Phenol in Aqueous Solutions Using Titanium Dioxide

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Abstract : In this study, photo-catalytic degradation of phenol by titanium dioxide (TiO₂) in aqueous solution was evaluated. The UV energy of solar light was utilized by compound parabolic collectors (CPCs) technology. The effect of irradiation time, initial pH, and dosage of TiO₂ were investigated. Aromatic intermediates (catechol, benzoquinone, and hydroquinone) were quantified during the reaction to study the pathways of the oxidation process. 94.5% degradation efficiency of phenol was achieved after 150 minutes of irradiation when the initial concentration was 100 mg/L. The dosage of TiO₂ significantly affected the degradation efficiency of phenol. The observed optimum pH for the reaction was 5.2. Phenol photo-catalytic degradation fitted to the pseudo-first order kinetic according to Langmuir-Hinshelwood model.

Keywords : compound parabolic collectors, phenol, photo-catalytic, titanium dioxide

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