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Photocatalytic degradation of phenol in a fluidized bed reactor utilizing immobilized TiO2 photocatalyst: Characterization and process studies

Abstract

Remediation of hazardous materials in water has emerged as a top priority over the years. Organic pollutants in water are one of the major constituents in water pollution. Phenol is one of the organic pollutants which are commonly found in the effluent of industries such as petroleum refineries and petrochemicals. Conventional treatment techniques such as filtration and flocculation and carbon adsorption have limitations of their own. Thus, photocatalysis offers a possible alternative in treating wastewater effluent containing phenols. This study attempts to evaluate photocatalytic degradation of phenol in a fluidized bed reactor. Immobilized TiO_2 supported onto quartz sand was used as the photocatalyst and characterized using SEM, EDX and XRD analysis. The performance of the supported photocatalyst is evaluated in different operating parameters such as photocatalyst loading and initial phenol concentration.

Keywords

Photocatalysis; Phenol; Titanium dioxide; Fluidized bed reactor