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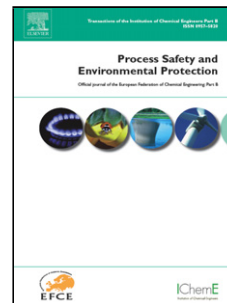
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Comparing performance of three forms of hematite in fixed bed reactor for a photocatalytic decolorization: Experimental design, model fitting and optimization of conditions

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Abstract

α -Fe₂O₃ in three forms of bulk, bare nanoparticles and stabilized nano particles by pectin were used in a fixed bed reactor with changeable diameter of flexible wall and two lamps inside column as a novel design for photocatalytic decolorization of methylene blue (MB) in aqueous solution. At first, the portion of photo degradation as one of the MB removal mechanisms was determined due to comparing performance of reference and experimental reactors. Three parameters of fixed bed reactor containing initial effective diameter of reactor (D_E), inlet flow rate (F) and residence time (τ) were analyzed, experimentally, and the obtained results using three photocatalyst agents were compared. The experimental data was fitted as a function of the independent variables and proposed by the final equations in the terms of coded and actual factors as the linear models for nano α -Fe₂O/pectin and bare nano α -Fe₂O, and the quadratic model for bulk α -Fe₂O₃. The most decolorization (C_0 MB 100 mg L⁻¹) as the experimental and

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