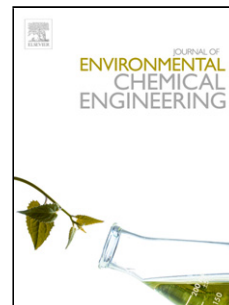


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Degradation of Textile Wastewater by Modified Photo-Fenton Process: Application of Co(II) Adsorbed Surfactant-modified Alumina as Heterogeneous Catalyst

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ABSTRACT

Fenton method is well recognized for organic pollutant degradation. However, traditional Fenton method has several drawbacks for practical application. In this regard different catalysts and modified Fenton processes are developed for better efficiency. In this study, a new catalyst is developed for methylene blue (MB) and methyl orange (MO) degradation under heterogeneous photo-Fenton process in presence of H_2O_2 and visible light. Finally, the catalyst was successfully applied for real textile wastewater degradation also. Here the as-prepared catalyst is the Co(II), which is adsorbed on the bilayer structure of sodium dodecyl sulfate (an anionic surfactant) formed on alumina support. The catalyst is designated as Co-SMA. The degradation characteristics of both the dyes are discussed. The MB, being a cationic dye, gets fully adsorbed on Co-SMA surface and the reaction proceeds on the solid surface with zero order kinetics. On the other hand, the degradation of MO follows first order kinetics because of its low adsorption. The efficiency of decolorization of real wastewater is found to be > 92% in 60 min time of reaction with 10 g L^{-1} of Co-SMA, $37.9\text{ mM } H_2O_2$ and 10010 lux light intensity. Leaching of cobalt from Co-SMA is very less during the reaction which is advantageous for environmental applications.

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