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Fenton oxidation of carpet dyeing wastewater for removal of COD and color

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ABSTRACT

The decolorization and chemical oxygen demand (COD) removal of carpet dyeing wastewater by Fenton oxidation process was investigated at various reaction conditions. The initial COD of carpet dyeing wastewater was 2760 mg/l and its color in term of absorbance was 2.7. The effect of various parameters such as pH, ferrous sulphate concentration, hydrogen peroxide concentration, reaction time, and temperature on COD and color removal of carpet dyeing wastewater by Fenton oxidation were studied. Using Fenton oxidation, the optimum operating conditions of pH of 4, $FeSO_4$ concentration 4 g/l, H_2O_2 concentration 30 g/l, temperature 25°C, and 30 min reaction time at atmospheric pressure, giving maximum color and COD removals of 93% and 98%, respectively, were found. The carpet dyeing wastewater can be satisfactorily treated by adopting this process. The calorific value of dried residue obtained after thermal treatment was 12.8 MJ/kg, which is about 76% to that of lignite coal and thus could be used as a solid fuel. Also the dye degradation kinetics was studied.

Keywords: Carpet dyeing wastewater; COD removal; Color removal; Fenton oxidation

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