



Degradation of sulfolane in petrochemical industry wastewater by electro-Fenton treatment using response surface method

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ABSTRACT

In this research, electro-Fenton method was used for removal and degradation of sulfolane in a petrochemical wastewater. It was selected as candidate because high solubility in water, chemical and thermal stability, low volatility and its difficult treatment. It was demonstrated that electro-Fenton method was carried out in a batch electrolytic reactor for degradation more than 97.5% sulfolane at time 60 min. The effect of operating conditions including current density, H_2O_2 dosage and pH of sample on the efficiency of process was investigated using response surface method. It was found the optimized conditions were current density 15 mA cm^{-2} , H_2O_2 dosage 3% (v/v) and pH 2.5, although the pH has the most effect on removal efficiency. Furthermore, the consumption of energy, iron electrodes consumption, chemical oxygen demand (COD) and biochemical oxygen demand (BOD) removal and the amount of sludge produced during the application of this method were evaluated at optimum conditions. The COD and BOD removal were 55% and 43%, respectively. The degradation pathway of sulfolane by electro-Fenton as well as the transformation products was investigated using GC-FID, GC-MS, GC-SCD and total sulfur analyzer. The results demonstrated that the electro-Fenton was a feasible technique for degradation of sulfolane contaminated petrochemical wastewater.

Keywords: Sulfolane; electro-Fenton; Removal; Treatment; Industrial wastewater

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