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A study on the removal of sulfate and nitrate from the wet scrubber wastewater using electrocoagulation

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ABSTRACT

Wet scrubber is widely used to remove pollutants from a furnace flue gas or from other gas streams. However, high cost for the treatment or exchange of contaminated washed water is one of the problems. Electrocoagulation (EC) is an electrochemical method for treating polluted water, whereby sacrificial anodes dissolve to produce active coagulant precursors in the solution. This technology can be used for the removal of color, anionic contaminants, and colloidal particles. The goal of the present study was evaluation of EC process for treatment of wet scrubber wastewater and optimization of the process. In this study, the influence of electrode material and electrode distance on removal efficiency (%) of nitrate, sulfate, and total suspended solids (TSS) was investigated with synthetic wastewater. Using an Al electrode, 60.6% of nitrate, 50.0% of sulfate, and 96.8% of TSS were removed by EC treatment within 30 min. In case of Fe electrode, 69.7% of nitrate, 75.0% of sulfate, and 98.8% of TSS were removed. The treatment efficiency for real wet scrubber wastewater was evaluated with Fe electrode. After 180 min of EC treatment, 50% of color, 40% of nitrate, 40% of sulfate, and 95% of TSS were removed, respectively. All these results give clear evidence that EC process can effectively reduce the TSS, nitrate, and sulfate ions from wet scrubber wastewater.

Keywords: Electrochemical treatment; Electrocoagulation; Wet scrubber wastewater; Sacrificial electrode

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