

Short Communication

Simultaneous Removal of COD and Ammonia Nitrogen Using a Novel Electro-Oxidation Reactor: A Technical and Economic Feasibility Study

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A novel industrial-scale electro-oxidation device was built for simultaneous removal of Chemical Oxygen Demand (COD) and ammonia nitrogen in wastewater. The specific currents had a strong effect on removal rate and total current efficiency. At a specific current of 1440 A/m³ and electrolysis time of 40min, the concentrations of COD and ammonia nitrogen in effluent decreased from 128.75 mg/L and 69.18 mg/L to 50.0 mg/L and 5.0 mg/L, respectively. The stepping control for the specific current is useful for saving energy, and total current efficiency increased from 57.61% to 69.05% in response to use this stepping control model. The energy consumption was 4.34 kWh/m³, the total operation cost for one ton of effluent was about \$0.574 and the specific capital cost was \$420/m³/d. These findings indicate that the electro-oxidation process is capable of simultaneously decomposing refractory organics and ammonia nitrogen in wastewater.

Keywords: Electro-oxidation; Plunger flow electrochemical reactor; Ammonia nitrogen; Economic feasibility

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