Designing an Electrochemical System for Efficient Removal of Chromium from Leachate by Electrocoagulation Using a Solar Panel as the Power Supply

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Here, we report the removal of chromium from landfill leachate by electrocoagulation (EC) using iron and aluminum electrodes and a solar panel as the electrical energy source. Two rectangular plates of aluminum and iron were used as cathode and anode, respectively. Different kinds of operational parameters such as contact time, pH, inter-electrode distance and current density were investigated and optimized to obtain the best process function. Based on the findings, the removal efficiency of chromium increased by increasing the current density and the reaction time and decreasing the distance between the electrodes. The experimental results indicated that the removal efficiency of chromium of 98.0% from raw leachate was obtained under the optimized conditions of current density 4.5 A/m², initial pH of 3, contact times 27.0 min and the electrode-distance of 0.5 cm.

Keywords: electrochemical system; electrocoagulation; raw leachate; chromium; iron and aluminum electrodes

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