

عنوان مقاله:

Effect of Applied Potential on Removal of Cobalt from Polluted Water

محل انتشار:

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خلاصه مقاله:

The separation of a wide range of contaminants in surface water and groundwater has become a critical issue worldwide, due to population growth, rapid development of industrialization, and long-term droughts [1]. Heavy metals in wastewater are one of the severe environmental concerns. Due to the harmful effect of heavy metals in wastewater, it is necessary to find a good method to treat wastewater containing toxic metals to remove their hazardous effects on human health and ecology. In order to minimize the health risks of toxic heavy metals many methods have been suggested by different research groups to remove toxic heavy metal ions from wastewaters such as chemical precipitation, ion-exchange, membrane filtration, adsorption, electrochemical treatment, and so on. Although all of these techniques can be employed to remove heavy metals from wastewater, they also have some inherent advantages and limitations [1-3]. Electrochemical treatment technique for removal of heavy metal from wastewater is a process consisting of electrodisolution of soluble anodes, usually made of iron or aluminum. The generation of metallic cations takes place at the anode, due to the electrochemical oxidation of the iron or aluminum, whereas at the cathode the production of hydrogen typically occurs. Electrocoagulation process involves many chemical and physical phenomena, such as anodic oxidation, cathodic reduction, coagulation, electrophoretic migration, and adsorption. This method is regarded as a rapid and well-controlled method that requires fewer chemicals, provides good reduction yields and produces less sludge. Although all above techniques can be employed for the wastewater treatment, it is important to notice that the selection of the most suitable treatment techniques depends on some factors such as the initial metal concentration, the component of the wastewater, capital investment and operational cost, plant flexibility, reliability and environmental impact [4]. In this study, we attempt to remove cobalt from water electrochemically by applying different potential. The applied potential is an important parameter in all electrochemical systems. The electrochemical cell contains 200 mL of polluted water (~100 ppm cobalt) and two iron sheets as sacrificial anode and cathode. The reaction was conducted with an applied potential ranging from 8 V to 30 V, for half an hour. The concentration of cobalt in water before and after treatment was determined. The obtained results show that the ... concentration of cobalt in water after treatment is in the range ~8 ppm to ~44 ppm, depending on the

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