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REMOVAL OF DYES FROM WATER BY GALVANOCOAGULATION

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Abstract

Galvanocoagulation (GC) utilizing metallic iron chips and granular coke was studied as a potential technique for decolorization of dye-containing aqueous solutions. GC and chemical coagulation by inorganic metallic coagulants such as iron sulfates (Fe^{2+}, Fe^{3+}) were examined for the removal of individual dyes, used in the fur industry, from model aqueous solutions. The role of metal cations when progressively electrogenerated *in situ* was compared to when they are added simultaneously. The superiority of GC over chemical coagulation was established for the removal of the tested dyes as chemical coagulation required relatively high dosages of coagulant. Additionally, the specific dye removal ability, expressed as *q* (g/g), which is the maximum amount of dye removed per gram of iron, for GC was considerably higher compared to the one obtained from chemical coagulation. The efficiency of GC was also tested on real wastewater. The average percent removal of chemical oxygen demand (COD) and color was 90 % and 99 %, respectively, during 30 min of treatment. GC is considered a cost-effective and environmentally friendly method which, in the presence of hydrogen peroxide, may also be considered a Fenton-like Process. Using Acid Yellow as a model dye it was observed that the decolorization efficiency increased to 40% when a GC/H_2O_2 combination was used as compared to GC alone. UV treatment further increased the efficiency of the GC/H_2O_2 system. The dye removal is attributed to both the oxidation by the photo-Fenton reagent and the following adsorption.

Keywords: coagulation, dye removal, Fenton process, galvanocoagulation, wastewater treatment

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