REMOVAL OF DYES FROM WATER BY GALVANOCAOAGULATION

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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. To compare the role of metal cations, when they are electrogenerated progressively in situ and when they are added at once, 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 fur industry, from model aqueous solutions. The superiority of GC over chemical coagulation was established for removal of all tested dyes as in the case of chemical coagulation relatively high dosages of coagulant were required. 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 actual wastewater. The average percent removal of 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 refer to like Fenton Processes. Using Acid Yellow as a model dye it was observed that the decolorization efficiency increased to 40% when GC/H_2O_2 combination was used as compared to GC alone. The additional UV treatment 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.

Key words: coagulation, dye removal, Fenton process, galvanocoagulation, wastewater treatment

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