



Electrochemical degradation of some organic dyes by electrochemical oxidation on a Pb/PbO₂ electrode

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ABSTRACT

This work investigated the electrocatalytic degradation of three types of textile dyes by electrochemical oxidation on lead dioxide anode. The influence of pH, current density, time of electrolysis, temperature, the conductive salt concentration and the initial dye concentrations were critically examined. The results of these influences are expressed in terms of the remaining organic compounds concentrations (color removal) and Chemical Oxygen Demand (COD removal). Also, both of the current efficiency and power consumption values are calculated. In this manuscript we report that, the highest electrocatalytic activity was achieved in the presence of NaCl (3 g/l), 30 mA/cm², pH of 3 and temperature of 30 °C. The highest electroactivity could be attributed to indirect oxidation of the investigated dyes by the electrogenerated hypochlorite ions formed from the chloride oxidation. In addition, contribution from direct oxidation could also be possible via reaction of these dyes with the electrogenerated hydroxyl radicals adsorbed on the lead dioxide surface.

Keywords: Electrochemical degradation; Reactive dye; Direct dye; Disperse dye; PbO₂ electrode

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