Electrochemical Oxidation of Acid Brown 98 using Ti/Ru_{0.3}Ti_{0.7}O₂ Composite Anode

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Textile and leather industries effluent containing dyes are one of the major concern to flora and fauna. The electrochemical oxidation of a synthetic wastewater containing, acid brown 98 (AB 98) was investigated in a laboratory scale reactor containing Ti/Ru_{0.3}Ti_{0.7}O₂ composite anode. The degradation experiments were carried out at ambient temperature and pressure under different influential parameters such pH, different electrolytes, current density. The dye concentration and extent of mineralization were observed using UV-Visible Spectroscopy and Total Organic Carbon (TOC) analysis. The anode was characterized in the dye wastewater containing the appropriate amount of NaCl and Na₂SO₄ salts using cyclic voltammetry. The result demonstrate that the electrochemical oxidation of the synthetic dye solution increases with the decrease in pH and increase in the concentration of chlorine ions and current density (5-20 mAcm⁻²). It is also further determined that 67% TOC was removed using a 0.1 M, NaCl as an electrolyte and a 20mAcm⁻² current density, under 60 minutes of electrolysis. The energy consumption (kWhm⁻³) of the degradation is minimum at low current densities and high NaCl concentrations.. The kinetic study reveals that AB 98 degradation followed pseudo 1st order kinetics.

Keywords: decontamination, electrochemical degradation, dyes, wastewater

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