Electrooxidation and Electoreduction of Anthraquinone Chromophores at the Platinum Electrode

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This study investigates the electrochemical behavior of anthraquinone dyes in non-aqueous solution. Cyclic voltammetry and differential pulse voltammetry were used to estimate the electrochemical parameters of electrooxidation and electoreduction at the platinum electrode. The effects of different substituents on the electrochemical properties of solvent dyes were determined based on physico-chemical parameters such as the peak potential (E_{pa}), half-peak potential ($E_{pa/2}$) or half-wave potential ($E_{1/2}$). Theoretical methods were used to estimate the diffusion coefficients, solubility parameters and HOMO–LUMO gaps of the anthraquinone dyes. The structures and morphologies of the studied powders were also examined using scanning electron microscopy (SEM). Cyclic voltammograms showed multiple redox processes and revealed quasi-reversible behavior in all the studied dyes.

Keywords: electrochemistry; anthraquinone dyes; electrooxidation; electoreduction; Pt electrode

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