

Electrochemical Polymerization of 2,6-Dichloroaniline and Characterization of the Obtained Polymer

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Abstract:

Electropolymerization of 2,6-dichloroaniline on platinum electrode in acid medium was carried out under different reaction conditions as temperature, current density hydrochloric acid, and monomer concentrations with reaction during time. The initial rate of the electropolymerization reaction is small and the orders are found to be 0.94, 1.13, and 1.26 with respect to current density, acid, and monomer concentrations, respectively. The apparent activation energy (E_a) is found to be 65.1 kJ mol⁻¹. The rate law is $R_p = K^2 [D]^{0.94} [HCl]^{1.13} [M]^{1.26}$. The obtained polymer films are characterized by ¹H-NMR, elemental analysis, IR, and cyclic voltammetry. The mechanism of the electro-polymerization reaction has also been discussed. The thermogravimetric analysis is used to confirm the proposed structure and determination of the number of water molecules associated with each polymeric chain unit. X-ray and scanning electron microscopic analyses are used to investigate the surface morphology
