E2-05: Cyclic voltammetric studies of polyaniline/electrolyte interfaces

R M G Rajapakse, J S H Q Perera, L P P Lankeshwara
(Dept of Chemistry, Univ of Peradeniya)

Aniline can be readily polymerised on any electrode surface to produce a coating of the conducting polymer, polyaniline. Polyaniline electrodeposited on Pt-disc electrodes exhibits potential dependent conductivity.

In this study, aniline was polymerised on a Pt-disc electrode surface from a deoxygenated aqueous solution of aniline in 0.1 mol dm^{-3} $NaClO_4$ at pH 2 (pH of the solution was adjusted using $HClO_4$) at a potential of 0.7 with respect to a saturated calomel electrode. The thickness of the polyaniline film thus obtained depends on the time of electrodeposition. The polyaniline coated Pt electrodes were then washed to be free of monomeric aniline and subjected to cyclic voltammetry using 0.1 mol dm^{-3} $NaClO_4$ at pH 2 as the supporting electrolyte. Cyclic voltammogram of polyaniline thus recorded consisted 1 anodic peak and 2 cathodic peaks at 0.380, 0.525 and 0.080 V with respect to saturated calomel electrode respectively, at the scan rate of 20 mV s^{-1}. While the peak positions were found to be independent of the scan rate, the peak currents showed a marked dependence on it according to the formula $I_p = kv^n$, where I_p,v and k are the peak current, the scan rate and a constant

respectively. The value of n was found to be approximately 0.5, indicating that the redox processes occurring on the coated electrode surface were reversible.