E1-32: Study of electrical behaviour of polyaniline conducting films prepared at different pH values

K Premaratne[1], L M W K Gunaratne[1], R M G Rajapakse[2], L P P Lankeshwara[2]
([1]Dept of Physics, [2]Dept of Chemistry, Univ of Peradeniya)

Aniline was polymerized on platinum disc electrodes by electropolymerization in aqueous solutions in the presence of a background electrolyte, 0.1 M NaCl, at a potential of 0.7 V with respect to a saturated calomel electrode. The pH values of the solutions were adjusted using HCl.

Current - Voltage (I-V) measurements were carried out in solutions of 0.1 M NaCl, 0.1 M Na_2SO_4 and 0.1M $NaClO_4$ with pH values ranging from 1 to 3. The I-V data obtained showed that the conductivity of polyaniline was potential dependent. The shape of the voltammogram varied with the pH of the solution in contact with the polymer.

Decay of current due to application of a potential step was studied at different potentials. Eventhough the ideal Cottrell conditions indicate a power law of t^{-n} ($n = ½$) for the time rate of decay of current, the observed results showed values of n ranging from $n = 1$ to 2. Deviation from the ideal Cottrell behaviour could be due to the existance of non-Faradic currents in addition to the diffusion-limited current, during a potential step.