

Preparation of Conducting Poly(vinyl chloride)/Poly(pyrrole) Composites by Electrochemical Polymerization and Their Electrochemical Properties

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The influences of polymerization conditions on electrochemical properties of PVC/PPy composites, such as pyrrole and the electrolyte concentration, the charge consumed during polymerization, polymerization temperature, the nature of the electrolyte and the oxidation potential were studied by cyclic voltammetry(CV).

The conductivity of the composite increased with the increase of pyrrole and the electrolyte concentration, size of the cation from the electrolyte and charge consumed during polymerization but it decreased with the increase of oxidation potential.

CV results showed that peak separation, ΔE increased to a degree with the increase of pyrrole concentration. However, ΔE and anodic and cathodic peak potential, E_{pa} and E_{pc} remained unchanged, although the concentration of pyrrole and the electrolyte increased. Also, ΔE and E_{pa} increased with the increase of size of the cation and oxidation potential.

PVC/PPy composite films on platinum electrode when mounted in electrolyte solution could be electrochemically driven between the oxidized(conducting) form and the neutral(insulating) form. The PVC/PPy composite films were stable to this redox reaction and could be cycled repeatedly without the evidence of decomposition.