

Polypyrrole-polyethylene glycol conducting polymer composite films: Preparation and characterization

ABSTRACT

The preparation and characterization of polypyrrole-polyethylene glycol (PPy-PEG) composite films are reported in this present paper. The polypyrrole-polyethylene glycol composites were synthesized by electrochemical method, using p-toluene sulfonate as a dopant in aqueous medium. The composite films were synthesized with various concentration of PEG and were characterized by optical microscopy, x-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, photoacoustic spectroscopy and electrical conductivity measurement. Both the electrical conductivity and thermal diffusivity exhibited the highest values with the process condition of 0.2 M pyrrole, 0.1 M p-toluene sulfonate and 1×10^{-3} M PEG at 1.2 V (versus SCE). The optical microscopy of PPy-PEG shows the globular surface morphology. The XRD results demonstrated that PPy-PEG composite films are amorphous. The FTIR result reveals the successful incorporation of PEG into the PPy structure forming PPy-PEG composite films.

Keyword: Polypyrrole, Polyethylene glycol, Electrochemical method, p-Toluene sulfonate