

15. Structural study of Ni(NO₃)₂ doped polypyridine-polyvinyl acetate (PVAc) composite films.

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ABSTRACT

The conductive polymer composites are attractive materials for use in existing and emerging technologies due to their low cost and light weight. Doped polymer composites are expected to play an important role in the technical implementation of conducting polymers. Pyridine base polymers have attracted much interest because of their oxidative stability, photo physical characteristics and electron transport properties. Such electrically conductive polymer composites have been prepared by using metal powders and flakes as filler into insulating polymer materials.

This research paper aims to shed light on the synthesis of polypyridine-PVAc composite films prepared by chemical oxidative polymerization method, by changing oxidizing agent as well as doping materials. These composite films have been characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR).

In the present work XRD technique has been used to investigate the amorphous or crystalline nature of the samples. X-ray diffraction pattern shows crystalline nature of the samples. The appearance of sharp peaks in diffractograms of all samples may indicate some degree of crystallinity in the composites. The average crystallite size is estimated by using Scherer's formula $D = k\lambda/\beta\cos\theta$. For all samples of series I the crystalline nature is seen in the SEM pictures which reflected in XRD spectra. The crystalline nature of polypyridine-PVAc composite films is due to dopant Ni(NO₃)₂ and non uniform porous and voids are seen. The porous size varies from ~ 1 to 1.5 μm.
