Effects of contents of multiwall carbon nanotubes in polyaniline films on optical and electrical properties of polyaniline

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Abstract

We investigate the effects of different contents of multiwall carbon nanotubes (MWCNTs) on optical and electrical properties of polyaniline (PANI). The MWCNTs/PANI composites are deposited on glass substrates coated with indium tin oxide (ITO) by the spin-coating technique. The scanning electron microscopy shows that nanotubes are coated with the PANI layer and x-ray diffraction patterns show that all deposited composite films have an amorphous character. The analysis of a UV-vis spectrophotometer indicates the blue shift of the absorbance peak and a decrease in optical band gap value by the enhancement of the CNT content in the PANI matrix while the Urbach energy increases. The Raman spectrum shows the blue shift 1404→1417 cm⁻¹ and photoluminescence spectra show an increase in the intensity of characteristic PANI peak at 436nm with the increasing CNT content.