Improve spectroscopic structural and AC electrical conductivity of PC/PEO blend using graphene

Hind Alghamdi

University of Jeddah, Saudi Arabia

Nanocomposites of polycarbonate (PC) and polyethylene oxide (PEO) embedded with graphene oxide (GO) nanopowder have been prepared using casting method. Prepared nanocomposites are studied and investigated using different characterization techniques. The X-ray diffraction (XRD) pattern reveals the semi-crystalline nature of PC/PEO blend. There are no significant peaks characterizing pure graphene. The intensity of the main X-ray peak characterizing the blend is decreased with the increase of graphene content confirming a modification in the blend due to an addition of graphene oxide. The FT-IR spectra display the main characteristic IR bands due to vibrational function groups for the components. The Optical absorption spectra are measured as a function of wavelength in the range of 190–1100 nm. The UV/V spectra show two absorption bands at 290 and 620 nm due to electronic transitions. The value of Eg is obtained using indirect transition and its decrease with increasing the amount of graphene. The behavior of ε' and ε'' decreased with the increase of frequencies is observed. After adding graphene, the frequency is increased due to the dipole moment. The decrease of ε'' with increases of both the frequency and the temperature attributed to the origin of ε'' is the conduction losses. The decrease of dissipation factor (tan δ) is ascribed to the internal polarization mechanism related to applied frequencies. The maximum value of the peak at M" relation explained as being the result of the distribution of relaxation time.

halhusiki@kau.edu.sa