

Structural and dielectric properties of Graphite- Carbon nanotubes/Polyester ternary composites

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This study focuses on the development of a polyester composite material reinforced by the combined inclusion of two types of fillers, multi-walled carbon nanotubes (MWNT) and graphite (Gr). Microstructural observations shown that the carbon nanotubes and graphite nanoparticles were attached to the polyester surface. In order to understand the electrical and dielectric behavior of these ternary composites, the impedance spectroscopy method was used to measure the dielectric parameters of several samples over a temperature range of 300 to 400 K, and from 100 Hz to 1 MHz. Frequency dependence of the AC electrical conductivity obeys the universal dynamic response. Comparing the ternary composite (MWNT/Gr/Polyester) and the neat polyester, a relaxation phenomenon observed in the ternary composites and these relaxations changed with increasing of MWNT. So, these results suggest that the presence of the MWNTs greatly affect the dielectric properties of the neat polyester as a result of polarization phenomenon induced by these nanoparticles.

Keywords: Ternary composite, polyester, carbon nanotube, graphite, dielectric relaxation.

