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PHYSICAL PROPERTIES OF HIGHLY CRYSTALLIZED PET REINFORCED WITH MULTIWALLED CARBON NANOTUBES.

M. Aurilia[a], L. Sorrentino[b], S. Iannace[b], E. Milella[a]

[a]IMAST Technological District on Polymeric and Composite Material Engineering and Structures *Piazzale E. Fermi, 1, 80050, Portici (Na)- Italy and* [b]*CNR-IMCB Institute for composite and biomedical materials Piazzale E. Fermi, 1, 80050, Portici (Na)- Italy*

marco.aurilia@imast.it

The effects of carbon nanotubes dispersion into thermoplastic polymers are complex and strongly dependent upon the state of their aggregation. In this work a polyethylene terephtalate (PET) matrix has been reinforced with multiwalled carbon nanotubes (MWCNT). The MWCNT addition resulted in increased flexural modulus and in a decrease of flexural strength at room temperature. This behaviour has been related to the increase of reduced mobility of amorphous fraction due to the increase of crystallinity. The specific heat of PET nanocomposite measured by thermal analyses showed a dependence upon MWCNT content very similar to that of flexural modulus. These similar trends suggested the use of a modified Halpin-Tsai model (H-T) to determine a relationship between specific heat of PET and aspect ratio of dispersed MWCNT. Close values of MWCNT aspect ratio at each concentration were obtained by experimental data analyses performed by means of both classical and modified H-T models. The rigid amorphous fraction (RAF) of PET was estimated through a simple procedure based on modified H-T model. Its value was little higher than that calculated by loss tangent peak variation measured by dynamic mechanical experiments.