Study of Thermal and Mechanical Properties of Ethylene/1-Octene Copolymer Based Nanocomposites

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Abstract : Ethylene/1-octene copolymer was modified incorporating three types of nanofillers differed in their dimensionality in order to investigate the effect of filler dimensionality on mechanical properties, for instance, tensile strength, microhardness etc. The samples were prepared by melt mixing followed by compression moldings. The microstructure of the novel material was characterized by Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD) method and Transmission electron microscopy (TEM). Other important properties such as melting, crystallizing and thermal stability were also investigated via differential scanning calorimetry (DSC) and Thermogravimetry analysis (TGA). The FTIR and XRD results showed that the composites were formed by physical mixing. The TEM result supported the homogeneous dispersion of nanofillers in the matrix. The mechanical characterization performed by tensile testing showed that the composites with 1D nanofiller effectively reinforced the polymer. TGA results revealed that the thermal stability of pure EOC is marginally improved by the addition of nanofillers. Likewise, melting and crystallizing properties of the composites are not much different from that of pure.

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Keywords : copolymer, differential scanning calorimetry, nanofiller, tensile strength

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