

Experimental Study on Tensile Strength of Polyethylene/Carbon Injected Composites

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Abstract : The aim of this research was to investigate the effect of the addition of multi walled carbon nanotubes on the mechanical properties of polyethylene/carbon nanotube nanocomposites. To do so, polyethylene and carbon nanotube were mixed in different weight percentages containing 0, 0.5, 1, and 1.5% carbon nanotube in two screw extruder apparatus by fusion. Then the nanocomposite samples were molded in injection apparatus according to ASTM:D638 standard. The effects of carbon nanotube addition in 4 different levels on the tensile strength, elastic modulus and elongation of the nanocomposite samples were investigated. The results showed that the addition of carbon nanotube had a significant effect on improving tensile strength of the nanocomposite samples such that by adding 1% w/w carbon nanotube, the tensile strength 23.4%, elastic modulus 60.4% and elongation 29.7% of the samples improved. Also, according to the results, Manera approximation model at percentages about 0.5% weight and modified Halpin-Tsai at percentages about 1% weight lead to favorite and reliable results.

Keywords : carbon nanotube, injection molding, Mechanical properties, Nanocomposite, polyethylene

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