

Experimental Study on Hardness and Impact Strength of Polyethylene/Carbon 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: D6110 standard. The effects of carbon nanotube addition in 4 different levels and injection pressure in 2 levels on the hardness and impact strength of the nanocomposite samples were investigated. The results showed that the addition of carbon nanotube had a significant effect on improving hardness and impact strength of the nanocomposite samples such that by adding 1% w/w carbon nanotube, the impact strength and hardness of the samples improved to 74% and 46.7% respectively. Also, according to the results, the effect of injection pressure on the results was much less than that of carbon nanotube weight percentage.

Keywords : carbon nanotube, injection molding, mechanical properties, nanocomposite, polyethylene

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