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PARAMETERS AFFECTING CRYSTALLINITY OF THE BLEND COMPONENTS IN PP/PBT/NANOCLAY BLEND NANOCOMPOSITE FIBERS WITH MICROFIBRILLAR MORPHOLOGY

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The main objective of the present work was to investigate the relation between the phase morphology and crystallization behavior of dispersed phase and surrounding matrix in PP/PBT/Nanocaly hybrid system. The samples with the same blend ratio (80/20) but varying in organoclay content (1,3and5%) with and without the compatibilizer (iPPgMA) with both spherical and fibrillar morphology were considered . All the samples were prepared by using a melt compounding process in a co-rotating twin screw extruder and then melt spun by using single screw extruder equipped with a spinneret. An attempt was also made to study the effect of feeding method; direct method and PBT based masterbatch feeding method . From the results of differentional scanning calorimetry (DSC), it was found that degree of fractionated crystallization is dependent on the interface of PBT droplets and surrounding medium which could be controlled by nucleating effect of nanoclay and dispersed phase and surpassing chain motion by silicate layers as these are influenced by location of organoclay in the phases. The oriented PBT fibrils in the blend nanocomposite fiber were found to have a greater nucleating effect on crystallization of PP than the spherical PBT particles in the blend samples. However correlation between microfibrils and the PP matrix molecular orientation and its effect on crystallization in resulting blend nanocomposite fibers could hardly be explained, since it was found to be dependent on the partitioning of nanoclay which itself was affected by interfacial interaction, flow induced orientation of nanoclay and feeding method .