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INFLUENCES OF PARTITIONING OF ORGANOCLAY ON THE MICROFIBRILLAR MORPHOLOGY DEVELOPMENT OF PP/PBT BLEND NANOCOMPOSITE FIBERS

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The primary aim of this paper is to provide an insight on the effect of location of organoclay on the disperse phase deformation process in melt compounded polypropylene/Poly (butylene terephthalate)/Organoclay blend nanocomposite fibers prepared by different blending sequences. The PP/PBT blend nanocomposite samples with the same blend ratio (80/20) but varying in organoclay content (1,3and5) with and without compatibilizer (iPPgMA) were considered. All the samples were melt intercalated in a twin screw extruder and then melt spun into the fiber using a single screw extruder. Blend nanocomposite samples prepared by using two different feeding routes including direct and master batch system. The extent of melt intercalation was evaluated by XRD and morphology of the blend nanocomposite samples and their fibers were studied by means of SEM. The melt linear viscoelastic measurements were performed on the blend nanocomposite samples in order to provide some information about the microstructure of samples. By comparing results of the blend nanocomposite samples for which organoclay was first intercalated in PBT phase and the samples prepared by direct feeding of organoclay into the PP/PBT melt mixture, it was found that Cloisite30B is expected to preferentially be located inside the PBT droplet and/or interface. The results also showed greater extent of melt intercalation for the samples prepared by using PBT based masterbatch feeding. It was concluded that incorporation organoclay depending concentration, at low organoclay loading the tactoids and/or platelets may mostly be located in the interface which can assist the microfibril formation and final fibrils have lower diameters and better uniformity, while at higher nanoclay loading a large portion of organoclay can selectively be partitioned in the PBT droplet which damages the microfibril formation. It was also demonstrated that presence of nanoclay can play different roles on the extent of microfibrils formation depending on nanoclay partitioning.