



STUDY ON PARAMETERS AFFECTING THE MORPHOLOGY AND MULTI-WALLED CARBON NANOTUBES PARTITIONING IN POLYPROPYLENE/POLYAMIDE BASED BLEND NANOCOMPOSITES

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The main objective of this work was to study the effect of multi-walled carbon nanotubes (MWNTs) on the morphology development of polyamide6/polypropylene/MWNT nanocomposites (PA6/PP/MWNTs). An attempt was also made to investigate the role of compatibilizer (PP-g-MA) and feeding order on partitioning of MWNTs in these samples. The samples varying in blend ratio (70/30, 50/50, and 30/70 wt% of PA6 and PP) and MWNTs loadings (1, 3, and 5 wt%) were prepared by melt compounding and using two methods of feeding, direct feeding and the PA6-based masterbatch, were considered. All the samples were prepared by melt compounding in an internal mixer. The SEM results showed a decrease in PP dispersed phase due to the hindrance effect of MWNTs in the samples prepared by both orders of feeding, while in the case of the samples with PA6 dispersed phase, this effect could only be observed in the samples prepared by direct feeding method. This was attributed to lower concentration of MWNTs in PP matrix compared to those samples in which PA6 was matrix. The ability of the blend components and the compatibilizer in dispersing of MWNTs evaluated from the melt linear viscoelastic results, particularly the low frequency storage modulus values, was in order of: PP-g-M>PA>PP. This together with the feeding method were found to play key roles in determining the partitioning of MWNTs in the blend components as evidenced by the melt viscoelastic results. The presence of compatibilizer had greater influence on changing the blend ratio above which phase inversion occurred in comparison with MWNTs partitioning effect.