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Investigation on Compatibilizing Efficacy in Reactive PP/PA6/SEBS-g-MA Blends: Effect of PA6 Molecular Weight

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The kinetics of reactive compatibilization plays an important role in determining morphology and final physical properties of polymer blends.[1-4] In this study, two PP/PA6/SEBS-g-MA blend systems with different molecular weight (Mw) of PA6 resin were prepared using twin-screw extruder as a model system and their morphology and properties were compared systematically. It was found that the brittle-ductile transition of the low Mw PA6 (L-PA6) blend system occurs at lower SEBS-g-MA concentration with respect to the high Mw PA6 (H-PA6) blend system. The degree of compatibilization was evaluated by the phenomenon of the fractionated crystallization of dispersed PA6 and more remarkable compatibilizing effect was achieved for the L-PA6 blend system. Also, both blend systems exhibited different dependence of shear viscosity on SBES-g-MA concentration in the steady viscosity measurement. The study of linear viscoelastic properties showed that compared to the corresponding PP/L-PA6/SEBS-g-MA blends, higher storage modulus and complex viscosity at low frequency region were observed for PP/L-PA6/SEBS-g-MA blends at 6wt% SEBS-g-MA content. This result could be attributed to the difference in their dispersion state. RuO_4-stained TEM micrographs revealed that finer dispersion of PA6 particles was observed for PP/L-PA6/SEBS-g-MA blends at low SEBS-g-MA content. In this case, the well-defined PA6 particles with about 100-200nm in diameter encapsulated by an ultra-thin SEBS interlayer were evenly dispersed in PP matrix. These above differences between the two blend systems above were reasonably interpreted in terms of their different viscosity, which leads to the difference in the diffusion rate between reactive PA6 and SEBS-g-MA species during blending processes.

References:
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