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Thermal Stability and Crystallization Behaviour of Modified ABS/PP Nanocomposites

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Abstract : In this research work, poly (acrylonitrile-butadiene-styrene)/polypropylene (ABS/PP) blends were processed by melt compounding in a twin-screw extruder. Upgrading of the thermal characteristics of the obtained materials was attempted by the incorporation of organically modified montmorillonite (OMMT), as well as, by the addition of two types of compatibilizers; polypropylene grafted with maleic anhydride (PP-g-MAH) and ABS grafted with maleic anhydride (ABS-g-MAH). The effect of the above treatments was investigated separately and in combination. Increasing the PP content in ABS matrix seems to increase the thermal stability of their blend and the glass transition temperature (Tg) of SAN phase of ABS. From the other part, the addition of ABS to PP promotes the formation of its β-phase, which is maximum at 30 wt% ABS concentration, and increases the crystallization temperature (Tc) of PP. In addition, it increases the crystallization rate of PP.The β-phase of PP in ABS/PP blends is reduced by the addition of compatibilizers or/and organoclay reinforcement. The incorporation of compatibilizers increases the thermal stability of PP and reduces its melting (ΔHm) and crystallization (ΔHc) enthalpies. Furthermore it decreases slightly the Tgs of PP and SAN phases of ABS/PP blends. Regarding the storage modulus of the ABS/PP blends, it presents a change in their behavior at about 10°C and return to their initial behavior at ~110°C. The incorporation of OMMT to no compatibilized and compatibilized ABS/PP blends enhances their storage modulus.

Keywords : acrylonitrile, butadiene, styrene terpolymer, compatibilizer, organoclay, polypropylene
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