

Thermal and Mechanical Properties of PET/LDPE Blends

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This study is aimed to evaluate the effect of PE on PET properties, both thermal and mechanical properties, in PET and LDPE blends. The various contents of LDPE in PET/LDPE blends, with and without compatibilizer, 10 % by weight of MA-g-HDPE added with respect to the blend composition, were studied. PET and LDPE, with the formulations of 90:10, 80:20, 70:30 and 60:40, were blended in a co-rotating Twin Screw Extruder. The blends of PE/LDPE/MA-g-HDPE with formulation of: 81:9:10, 72:18:10, 63:27:10 and 54:36:10 were also blended in the extruder. The palletized extrudate were then characterized using DSC and TGA techniques to evaluate crystallinity, melting temperature and degradation temperature of the blends. The palletized extrudate were also injection molded for tensile, impact and hardness testing. The morphology of the blends was also examined using SEM technique.

The DSC results revealed that, without compatibilizer, the present of LDPE effected crystallization of PET, by showing 2 melting peaks, around 230-260°C, on the thermograms. In term of thermal stability, the high content of LDPE would be able to thermally stabilize the blend, especially with the blend system containing compatibilizer. Considering tensile properties, it was found that Young's Modulus and Tensile strength of the blends decreased whereas elongation at break increased with the contents of LDPE. However, the present of compatibilizer brought tensile strength and elongation up to the higher values than without it. Meanwhile, Young's modulus was suffered by the present of the compatibilizer. Undoubtedly, the impact energy needed for fracture the blend specimens was increased with the contents of LDPE and even more pronounced with the present of compatibilizer. LDPE clearly lowered the hardness of the blends. It was found from SEM micrographs that the blends were clearly miscible using compatibilizer up to the high ratio of 63/27/10. At the high content of 54/36/10, the phase separation was found to be very clear in the micrograph due to the limited amount of compatibilizer used in this blend composition.

REFERENCE

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ABSTRACTS



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