Effect of Nanosilica on the Morphology and Mechanical Properties of TPOs Containing Varying Amounts of a Polyolefin Elastomer

Lee Sung Hyo, Kontopoulou Marianna

Thermoplastic Olefin (TPO) blends based on isotactic polypropylene (PP) and ethylene-α-olefin copolymer-based polyolefin elastomers (POE) were prepared at various blend ratios using a co-rotating twin-screw extruder. The effect of nanosilica addition on the morphology and mechanical properties of the blends was examined in the presence of a maleated PP compatibilizer. Addition of nanosilica resulted in a finer dispersed domain size, and changes in the co-continuous morphology at the phase inversion composition. Nanosilica also affected the coarsening dynamics upon annealing of the blends. The nanocomposites exhibited improvements in flexural and Young's moduli, whereas the impact strength remained unaffected. These improvements were associated to a morphology wherein the filler partitions preferentially in the rigid PP phase.