Blends of poly(ethylene terephthalate) with a maleic anhydride grafted Styrene-Ethylene-co-Butylene-Styrene

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Styrene-Ethylene-co-Butylene-styrene (SEBS) was modified by the grafting reaction of maleic anhydride (MA) with the aid of dicumyl peroxide (DCP) as initiator in a Brabender mixer and the effect of the concentration of MA and initiator, as well as the processing conditions, such as temperature and rotor speed, on the grafting yield and gel content were examined. The amount of grafted MA groups on the rubber is determined by chemical titration and the degree of grafting is measured by infrared analysis. Then several home-made and commercially available SEBS grafted with maleic anhydride (SEBS-g-MA) were blended with poly (ethylene terephthalate) (PET). Both binary and ternary blends (consisting of a blend of SEBS and SEBS-g-MA) were examined and the mechanical and morphological properties of the resulting blends were evaluated by SEM, tensile and impact tests. Calorimetric studies indicated that the presence of a compatibilizer had no appreciable effect on the crystallization behavior of the blends. Particle size was strongly dependent on the functionality of the graft copolymer: the higher the functionality, the smaller the particle size and the narrower the particle size distribution. The finest phase morphologies having submicron particle sizes were obtained with commercial grade of SEBS elasomer, functionalized with 1.84 wt% maleic anhydride grafted onto the ethylene-butylene midblock. The presence of only a small amount of MA (0.12 wt% anhydride in compatibilizer) in compatibilizer is sufficient to induce a pronounced reduction of the dispersed phase particle size.