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THE EFFECT OF POLYISOBUTYLENE RESIN ON THE RHEOLOGICAL BEHAVIOR OF ELECTRON BEAM IRRADIATED POLYPROPYLENE IN THE PRESENCE OF A MULTIFUNCTIONAL MONOMER

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The rheological properties of electron beam irradiated polypropylene homopolymer containing polybutene resin and TMPTMA multifunctional monomer were studied in this research. The effect of PB resin during the inducing long chain branches are evaluated by various viscoelastic parameters. The PB free radicals formed during the irradiation may bound to PP free radicals and suppress the degradation process. The viscoelastic parameter were determined by small amplitude oscillation rheometry in the linear viscoelastic range of deformation. The zero shear viscosity-?0- of samples containing 2.5 wt% PB resin considerably decreased to ?0=5500 Pa.s (from ?0=11500 Pa.s) which indicates the plasticizing effect of PB resin on the ease of movement of PP macromolecules. By increasing irradiation dose the complex viscosity of samples at the medium and high range of shear rates are decreased up to 75 kGy and increased again at 100 kGy. The formation of branched structure is evident in the viscosity behavior. The Newtonian-Plateau is going to disappeared by forming branched structure and the onset of shear thinning is shifted to lower frequencies. The amount of PB resin in the formulations affects the zero shear viscosity ratios of irradiated samples. The best result is obtained for the sample with 2.5wt% resin that its viscosity ratio is bigger than other samples. This results show that using small amount of PB resin increase branching efficiency which is the evidence of mobilizing effect of PB resin.