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Linear Viscoelastic Behavior of PS/PMMA Compatibilized Blends

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In this work, the influence of the addition of statistic copolymer P(S0.5-ran-MMA0.5) on the rheological properties of a blend containing w = 5, 10, 15 and 20 wt% polystyrene in a poly(methyl methacrylate) matrix, was studied. Concentrations of compatibilizer P(S0.5-ran-MMA0.5) ranging from 0 to 20 wt% with respect to the dispersed phase PS were used for all PMMA/PS blend compositions. The polymer blends were processed in an internal mixer and their morphology was observed by scanning electron microscopy. The dynamic response obtained as a response to small amplitude oscillatory shear (SAOS) was compared to theoretical models that relate the morphology, interfacial tension and viscosities of the polymers forming the blend to the rheological behavior of the blend. The relaxation spectra of the blends were inferred. The 90/10 and 95/05 blends showed three relaxation times which corresponded to the relaxation of the phases, the shape of the dispersed phase and a third relaxation time $\tau\beta$, which was associated with interfacial properties of compatibilizer in polymer blend. The values of these relaxation times and the comparison of the experimental data to the generalized version of Palierne's[1] model were used to infer the interfacial tension and the interfacial stress modulus as a function of concentration of compatibilizer.

[1]- PALIERNE, J.F.: Linear rheology of viscoelastic emulsions with interfacial tension, Rheologica Acta, v. 29, p. 204, 1990.