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Relaxation and Recovery Phenomena in Melts of Multiphase Polymer Blends

*U.A. Handge**Institute of Polymers, HCI H 529, Department of Materials, ETH Zürich, 8093 Zürich,
Switzerland*

In this study, we investigated interfacial tension driven phenomena in molten polystyrene/poly(methyl methacrylate) (PS/PMMA) blends. Using elongational rheometers which apply the technique of clamps with rotating metal belts, we experimentally studied PS/PMMA blends in relaxation and recovery after melt elongation. In relaxation after melt elongation, the interfacial tension can cause interesting breakup phenomena. Our experiments revealed that the breakup of equibiaxially highly elongated PS drops can lead to a much larger number of PS droplets than the breakup after uniaxial elongation. In recovery experiments after uniaxial elongation, the molecular recovery of the blend components superpose to the total recovery of the blend. At large recovery times, the interfacial tension contributes to the elasticity of the PS/PMMA blend.