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Probing Flow-Induced Morphology of Reactively Compatibilized Polymer Blends with Rheology

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The flow-induced morphology was studied in immiscible blends, containing polypropylene (PP) and polystyrene (PS), with a droplet-matrix microstructure (20 wt% PS as dispersed phase). Small amplitude oscillatory measurements were used for this purpose. The data were analyzed using the general Palierne model with an interfacial shear modulus. The effects of the amount of compatibilizer and previous shear history were investigated systematically. The experimental results indicate that two relaxation mechanisms exist in the reactively compatibilized blends. The two corresponding relaxation times change with both the amount of compatibilizer and previous shear history. They have the same magnitude and combine to a single shoulder when the previous shear rate is less than 0.5 s-1. When the amount of compatibilizer is increased to 5 wt%, a single shoulder in the relaxation spectra curve can be observed and the corresponding relaxation time is less dependent on the previous shear history, indicating that the morphology is almost fixed.