

Stress relaxation of bi-disperse polystyrene melts - DTU Orbit (08/11/2017)

Stress relaxation of bi-disperse polystyrene melts: Exploring the interactions between long and short chains in non-linear rheology

We present start-up of uniaxial extension followed by stress relaxation experiments of a bi-disperse 50 % by weight blend of 95k and 545k molecular weight polystyrene. We also show, for comparison, stress relaxation measurements of the polystyrene melts with molecular weight 95k and 545k, which are the components of the bi-disperse melt. The measurements show three separated relaxation regimes: a fast regime, a transition regime, and a slow regime. In the fast regime, the orientation of the long chains is frozen and the stress relaxation is due to stretch relaxation of the short chains primarily. Conversely in the slow regime, the long chains have retracted and undergo relaxation of orientation in fully relaxed short chains.

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