

Intrinsic Nonlinearity Q_0 of Semi-dilute Polystyrene (PS) Solution under Large Amplitude Oscillatory Shear (LAOS) Flow

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LAOS test has been widely studied in order to understand nonlinear viscoelasticity of viscoelastic material. In this study, we studied linear and nonlinear rheological properties of monodisperse linear polystyrene (PS) solutions from FT-rheology. PS homopolymers with narrow polydispersities were dissolved in dioctyl phthalate (DOP) to determine the effect of polymer concentration. PS solutions were classified into two categories: semi-dilute unentangled and semi-dilute entangled according to linear viscoelastic properties (G' and G''). In nonlinear master curves, semi-dilute unentangled solutions showed plateau behavior of Q_0 while semi-dilute entangled solutions showed one peak corresponding to the characteristics of monodisperse linear samples. This results allow us to predict and characterizes relaxation processes of various topologies in commercial synthetic polymers.