

Abstract Submitted
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Collapse and Aggregation of Polymers in Solvents with Varying Molecular Sizes below θ -Temperatures¹ GI XUE, FANGFANG TAO, XIAOLIANG WANG, DONGSHAN ZHOU, Department of Polymer Science and Engineering, Nanjing University — The collapse and interpenetration of polymer in various solvents were monitored by fluorescence below θ -temperatures. Polystyrene was labeled with a donor and an acceptor groups respectively. Dilute and semidilute solutions in cyclohexane and DOP (dioctylphthalate) containing a mixture of the two polymers were monitored by nonradiative energy transfer. We found that PS collapsed to dis-entangled globules in DOP, while it collapsed and aggregated to interpenetrated particles in cyclohexane as the solutions were cooled from their θ -temperatures. This can be attributed to the effect of viscoelasticity; namely, the diffusion coefficient of chain segments is very small in solvent with larger molar size due to the high viscosity, each chain becomes a tiny glassy ball before collision and association with other chains. The dis-entanglement of the glassy polymer was confirmed by a recently developed ¹H solid state NMR.

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