

Critical Temperature Shift and Mixing in Polymer Blends Under Simple Shear Flow

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Small Angle Neutron Scattering (SANS) has been used to measure the influence of shear flow on a polymer blend near critical point. When combined with dynamic light scattering measurements, data reveal that the long-range critical fluctuations begin to break apart which is related to the decrease of critical temperature caused by the flow. This can be compared with the theoretical predication of Onuki and Kawasaki. For phase separated blends, homogenization occurs via repeated domain fragmentation, which gives way to distinct patterns in the strong shear limit. Data for a variety of systems collapse onto universal scaling curves that are in good agreement with modern theories.

KEYWORDS: small angle neutron scattering, critical temperature shift, polymer blends, pattern formation, shear on mixing