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Particle-Tracking Velocimetric Investigation of Large Amplitude Oscillatory Shear of Entangled Polymer Melts GREGORY ZARTMAN, YANGYANG WANG, SHI-QING WANG, The University of Akron — Large amplitude oscillatory shear (LAOS) experiments were carried out on a series of entangled monodisperse styrene-butadiene random copolymers (SBR). The deformation field during the measurements was monitored with a particle-tracking velocimetric technique. It was found that when the applied frequency was higher than the overall relaxation rate of the sample, the entangled melt would undergo uniform deformation at small strains, but exhibit shear banding at large strains. The inhomogeneity of the deformation field suggests that yielding through chain disentanglement cannot take place uniformly. This is the first report of shear banding in LAOS for melts and consequently rules out any speculation that shear banding could originate from concentration variation (due to shear induced phase separation) in entangled solutions.

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