

Abstract Submitted
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Non-Gaussian Stretching Behavior of Entangled Polymers

YANGYANG WANG, SHI-QING WANG, The University of Akron — The behavior of entangled SBR melts and solutions in rapid uniaxial extension has been studied by rheometric and rheo-optical measurements. A yield-to-rupture transition occurs around the same Rouse Weissenberg number of nine for all samples when the failure mechanism changes from chain disentanglement (yielding) to chain scission. Our results show that elastic rupture takes place only when chains between entanglements are near full extension, the strain at rupture grows with increasing entanglement spacing, and the critical stress for rupture is proportional to the polymer concentration. These characteristics validate the well-known idea to represent entangled polymers in terms of a transient network.

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