

Abstract Submitted
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What deformation does and does not do in ductile polymer glasses JIANNING LIU, SHI-QING WANG, Department of Polymer Science, University of Akron — Entangled polymeric liquids have so far only shown strain softening, signified by stress overshoot upon startup shear. We show for the first time that entangled solutions of polymers with high glass transition temperature undergoes non-Gaussian chain stretching, losing its ability to yield through chain disentanglement. The stronger than linear increase of the shear stress with the strain ends with a sharp decline, forming a cusp. In situ visualization by particle-tracking velocimetry confirms that the solution undergoes abrupt rupture at a shearing plate in the sample interior. The rapid sample recoils elastically, producing the observed stress drop.

Gengxin Liu
Department of Polymer Science, University of Akron

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