

Abstract Submitted
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Uniaxial Extension of Entangled Polymer Melts close to T_g ¹ HAO SUN, SHI-QING WANG, The University of Akron — Transient (nonlinear) responses of entangled polymers to startup deformation indicate a transition from the initial elastic deformation to irreversible deformation (flow) [1-3]. This yielding behavior varies with the applied rate: at a higher rate the entanglement network can be strained to a higher degree before its breakdown. In this work, we subject entangled melts such as polystyrene to startup uniaxial extension to show how yielding takes place as a function of temperature. The objective is to explore whether there would be any mechanical signature of emergence of any secondary structure as the glass transition temperature T_g is approached from above.

[1] S. Q. Wang, S. Ravindranath, Y. Wang and P. Boukany, *J. Chem. Phys.* **127**, 064903 (2007).

[2] Y. Y. Wang and S. Q. Wang, *J. Rheol.* **53**, 1389 (2009).

[3] S. Q. Wang, S. Ravindranath and P. E. Boukany, *Macromolecules* **44**, 183 (2011).

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