Uniaxial Extension of Entangled Polymer Melts close to $T_g$  

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.


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