Abstract Submitted
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Nano confinement effects on dynamic and viscoelastic properties of Selenium Films[1] HEEDONG YOON, GREGORY MCKENNA, Texas Tech University — In current study, we use a novel nano bubble inflation technique to study nano confinement effects on the dynamic and viscoelastic properties of physical vapor deposited Selenium films. Film thicknesses ranged from 60 to 260 nm. Creep experiments were performed for the temperatures ranging from $T_{g,macroscopic}$-14 °C to $T_{g,\,macroscopic}$+19 °C. Time temperature superposition and time thickness superposition were applied to create reduced creep curves, and those were compared with macroscopic data [J. Non-Cryst. Solids. 2002, 307, 790-801]. The results showed that the time temperature superposition was applicable in the glassy relaxation regime to the steady-state plateau regime. However in the long time response of the creep compliance, time thickness superposition failed due to the thickness dependence on the steady-state plateau. It was observed that the steady state compliance increased with film thickness. The thickness dependence on the plateau stiffening followed a power law of $D_{Plateau} \propto h^{2.46}$, which is greater than observed in organic polymers where the exponents observed range from 0.83 to 2.0 [Macromolecules. 2012, 45 (5), 2453-2459].

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