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Structural Recovery of Single Polystyrene Ultrathin Films YUNG P. KOH, SINDEE L. SIMON, Texas Tech Univ — Glasses are not at equilibrium and, thus, structure evolves towards equilibrium in a process termed structural recovery. In this work, nanocalorimetry is used to investigate structural recovery for single polystyrene ultrathin films. In addition to being able to study single films with this technique, we can also investigate the response at aging times as short as 0.01 s, as well as aging at temperatures as high as T_g + 15 K for high fictive-temperature glasses obtained at high cooling rates. The results indicate that structural recovery progresses as expected when the aging temperature is low compared to the initial fictive temperature. In this case, the fictive temperature evolves towards the aging temperature at a rate that depends on the aging temperature and initial fictive temperature (i.e., on the cooling rate prior to aging). At equilibrium, the fictive temperature $T_f = T_a$. For cases where the aging temperature is higher than the fictive temperature, the results of the calorimetric experiment can be explained by the relaxation that occurs both during isothermal aging and cooling. The influence of film thickness on the structural recovery response will be discussed.

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