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Fast Scanning Calorimetry Studies of Glassy Films of Toluene[1]
DEEPANJAN BHATTACHARYA, VLADISLAV SADTCHENKO, The George Washington University — Fast scanning calorimetry was used to prepare and characterize micron thick vapor-deposited and liquid-cooled films of toluene on a thin filament. At temperatures above and below standard glass transition temperature (Tg) of toluene, the vapor-deposited films were prepared by physical vapor deposition at deposition rates of approximately 15 nm/s and the liquid-cooled films were prepared by quenching of liquid, 10 K above Tg, at a rate of approximately 5 K/s. It was found that vapor-deposited films have lower enthalpy and higher kinetic stability than liquid-cooled films even at temperatures approaching slightly above Tg. The most stable vapor-deposited films were prepared at temperatures 5 K below Tg. The kinetic stability of this film increased by about 4 K when the deposition rate was lowered from 40 nm/s to about 0.5 nm/s. A negligible change in the kinetic stability of this film was observed as long as the thickness was above 200- 300 nm range. The nature of the substrate had negligible impact on the phase's kinetic stability. We will report the results of our FSC studies and compare them with those of other contemporary findings.

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