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Stable organic glasses transform into unusually mobile liquids via growth growth fronts MARK EDIGER, STEPHEN SWALLEN, University of Wisconsin - Madison, THOMAS MATES, University of California at Santa Barbara — Physical vapor deposition onto substrates near 0.85 Tg can prepare organic glasses with low enthalpy, high density, and high thermal stability. Secondary ion mass spectrometry on isotopically labeled multilayer films of tris-naphthylbenzene and indomethacin stable glasses is used to study the evolution of these materials upon heating above Tg. In contrast to ordinary glasses, when stable glasses are held above Tg they transform to a liquid via a growth front mechanism. In these experiments, growth fronts are initiated at the free surface of the glass and in some cases at the glass/substrate interface or an internal interface in the glass. Diffusion in the liquid that results from the growth front is initially 2-5 times faster than for the equilibrium supercooled liquid at the same temperature; the nature of this liquid is unclear. Under some circumstances, the slow evolution of this unusually mobile liquid into the equilibrium supercooled liquid can be observed.

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