Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Molecular Mobility on the Surface of Glassy Tris-naphthylbenzene (TNB) ZAHRA FAKHRAAI, University of Wisconsin-Madison, CHAD DALEY, University of Waterloo, STEPHEN F. SWALLEN, DANIEL SCIFO, University of Wisconsin-Madison, JAMES A. FORREST, University of Waterloo, MARK D. EDIGER, University of Wisconsin-Madison — Mechanical relaxation measurements on the surface of polymeric glasses show that as the bulk material falls out of equilibrium at Tg a thin layer at the surface behaves like a liquid with relaxation times that are orders of magnitude faster and more weakly temperature dependent compared to those of the bulk glass. However the origin of this phenomenon remains elusive. Recently exceptionally stable glasses of small organic molecules have been produced by physical vapor deposition at temperatures below Tg, suggesting that these glasses also exhibit enhanced surface mobility. In this study gold nanoparticles were used to probe micron size meniscus formation on the surface of organic glass former TNB below Tg, a direct evidence of surface mobility in this material. Neutron scattering measurements of inter-diffusion between stacks of d-TNB and regular TNB layers during the deposition suggest that the temperature dependence of the diffusion on the surface is very similar to what is observed on polymeric films.

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Date submitted: 18 Nov 2010 Electronic form version 1.4