

Abstract Submitted
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Observing density-dependent formation of a fragile glass in surface-bound molecular chains L.I. CLARKE, M.P. ROMAN, D.R. STEVENS, M.C. SCOTT, J.R. BOCHINSKI, Dept. of Physics, NC State University, Raleigh, NC 27695 — Dynamics within a monolayer collection of surface-bound substituted-alkyl chains are studied with narrow-band dielectric spectroscopy. A transition from independent (intra-molecular) motion to complex, glassy (inter-molecular) motion is observed as the surface density increases. At high density, both the glassy mode [1,2] and the sub- T_g relaxation [3] have a direct analogy to the equivalent relaxations in polyethylene. Thus, this experimental approach enables observation of the formation of a fragile glass as an explicit function of density. Addition of a strong terminal dipole shows the transition occurring at lower density, dipole-mediated interacting dynamics in the low density regime, and increased dominance of the sub- T_g local mode. We will discuss results from monolayers and an analogous siloxane-based substrate where alkyl chain-chain distance can be similarly controlled. [1] M. C. Scott et al. *ACS Nano* **2**, 2392 (2008). [2] M. Beiner and H. Huth, *Nat. Mater.* **2**, 595 (2003). [3] Q. Zhang et al., *J. Phys. Chem. B* **110**, 4924 (2006).

Laura Clarke
Dept. of Physics, NC State University, Raleigh, NC 27695

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