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(G*) Surface Relaxation of Vapor Deposited Polystyrene Glasses

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Our laboratory has recently reported the technique of preparing stable glass films of polymers through PVD and the exceptional properties of these materials. This technique is in principle applicable to a wide range of polymers, and it has been demonstrated for polystyrene and poly(methyl methacrylate). Stable glasses are known to have higher density and enhanced kinetic stability compared to ordinary glasses, but less is known about their surface dynamics. We use AFM to probe the surface response of vapor deposited polystyrene stable glasses to the perturbation provided by gold nanoparticles placed on the free surface. The surface response of stable glasses and ordinary glasses (prepared by rejuvenating vapor deposited glass) shows that they have quantitatively similar surface dynamics. By varying the temperature of relaxation, we quantify the dependence of surface dynamics on temperature.

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