

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Impact of annealing and adsorption on the distribution of segmental mobility and tracer diffusivity of ultrathin films of polystyrene¹
SIMONE NAPOLITANO, CINZIA ROTELLA, MICHAEL WUBBENHORST, Katholieke Universiteit Leuven — We show experimental evidence that the changes ultrathin films undergo during annealing are strongly correlated to the amount of chains irreversibly adsorbed at the interface. A careful analysis of the time evolution of the dielectric function during annealing steps above T_g revealed three different regimes: at times much shorter than the adsorption time, the thickness of the adsorbed layer is constant and the interface mimics the effect of a free surface (packing frustration); upon increase of surface coverage, the films undergo a series of metastable states characterized by the largest changes in the deviations from bulk behavior; finally, when the thicknesses of the irreversibly adsorbed layer doubles its starting value, the system approach a new equilibrium whose properties are fixed by the new interfacial configurations. Our picture is further confirmed by the effect of annealing on the distribution of glass transition temperatures [1], dielectric relaxation strength and tracer diffusivity at different distances from the adsorbing interface.

[1] Rotella, Napolitano et al. *Macromolecules*, 2010, 43, 8686-8691

¹SN acknowledges FWO (Fonds Wetenschappelijk Onderzoeks - Vlaanderen) for a postdoctoral scholarship.

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Date submitted: 30 Nov 2010

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