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Substrate and chain size dependence of near surface dynamics of glassy polymers DONGPING QI, University of Waterloo, ZAHRA FAKHRAAI, JAMES FORREST, University of Waterloo — We report on the application of nanohole relaxation technique to study the surface relaxation of i-PMMA thin films. This allows us to obtain the time dependent relaxation function at a number of different sample temperatures for the first 2-3 nm of the free surface. By studying the film thickness dependence of the near-free surface relaxation for films on different substrates we are able to determine the range over which the substrate directly affects the free surface relaxation. This also allows us to determine a limiting thickness where the free surface relaxation is not affected by the substrate. For such films we determine the Mw dependence of the near free surface relaxation time and find a surprising linear Mw dependence. The Mw dependence is discussed in terms of possible motions as well as polymer configurations near the free surface.

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