

Abstract Submitted  
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**Molecular-weight Dependent  $T_g$  Depression of Silica-supported Poly( $\alpha$ -methyl styrene) Films<sup>1</sup>** KUN GENG, FEI CHEN, Department of Physics, Boston University, OPHELIA K. C. TSUI, Department of Physics and Division of Materials Science and Engineering, Boston University — The glass transition temperature ( $T_g$ ) of poly( $\alpha$ -methyl styrene) (P $\alpha$ MS) films supported by silica is studied as a function of film thicknesses from 17 to 168 nm at three molecular weights of 1.3, 20 and 420 kg/mol. For the 20 and 420 kg/mol films, the glass transition temperature decreases with decreasing film thickness, consistent with previous results. But for the 1.3 kg/mol films, it becomes independent of the film thickness. We tentatively suggest the  $T_g$  depression to be caused by free volume excess at the polymer-air interface and that its influence diminishes at low enough molecular weights because of a chain stiffness effect.

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