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Molecular-weight Dependent Tg Depression of Silica-supported Poly(alpha-methyl styrene) Films[1] OPHELIA TSUI, KUN GENG, Boston Univ — The glass transition temperature (T_g) of poly(α-methyl styrene) (PαMS) 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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Ophelia Tsui
Boston Univ

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