Abstract Submitted
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Effects of molecular weight and tacticity on the Tg of poly(methyl methacrylate) films supported by silica[1] KUN GENG, FEI CHEN, OPHELIA TSUI, Boston University Physics Department — The glass transition temperature (T_g) of poly(methyl methacrylate) (PMMA) films supported by silica is studied as a function of film thickness at different molecular weights (M_w) for different polymer tacticities. The T_g confinement effect is found to depend on the M_w and tacticity. For the films with a low M_w of 2.5 kg/mol,T_g is depressed for the atactic films, consistent with previous results. In contrast, the films with a higher syndiotactic content exhibit T_g enlargement as thickness decreases. We tentatively suggest this to be caused the influence of chain stiffness on the T_g that dominates at low M_w and varies with tacticity. For sufficiently high M_w, the effect of chain stiffness is expected to be small. At M_w = 50 kg/mol, the T_g confinement effect of the atatic and more syndiotactic films reverses from that observed of the low-M_w counterpart films. We suggest the chain stiffness effect to be negligible at this M_w, and attribute the opposite T_g confinement effect to be caused by a competition between the surface T_g and the substrate T_g in these films. The T_g found of bilayers made of the atatic and more syndiotatic PMMAs with this M_w supports our attribute.

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