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**Molecular weight and chain architecture dependence of glassy compliance of ultrathin freely standing polymer films** SHANHONG XU, GREGORY B. MCKENNA<sup>1</sup>, Texas Tech University — Glassy compliance of ultrathin linear polystyrene films of different molecular weights was investigated with the novel nanobubble inflation techniques developed in our lab. Previous work by O’Connell, Hutcheson and McKenna [1] indicates that the glassy compliance decreases as the film thickness decreases for a polystyrene sample with molecular weight of 1M g/mol. However the glassy stiffening is not nearly as dramatic as that observed in the rubbery plateau regime [2]. Preliminary results in the present work show that the glassy compliance decreases as the molecular weight increases. We are now examining a three-arm star polystyrene with branch molecular weight the same as that of the lower molecular weight linear material and eight-arm stars will also be investigated with the purpose of determining chain architecture effects on the glassy and rubbery behaviors of ultrathin polymer films.

[1] P.A. O’Connell, S.A. Hutcheson and G.B. McKenna, *J. Polym. Sci. Part B. Polym. Phys. Ed.*, **46**, 1952 (2008).

[2] P.A. O’Connell and G.B. McKenna, *Eur. Phys. J. E*, **20**, 143 (2006).

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