Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Geometry and molecular architecture effects in nanobubble inflation measurements SHANHONG XU, Texas Tech University, SYLVIE CASTAGNET, Laboratoire de Mecanique et Physique des Materiaux, Poitiers, France, GREGORY MCKENNA, Texas Tech University — Confinement effects on the mechanical properties of ultrathin polymer films were investigated by a bubble inflation technique developed in our lab. Prior studies of ultrathin films of poly(vinyl acetate) (PVAc) and linear polystyrene (PS) were performed on circular bubbles of different diameters. Here the creep behaviors of ultrathin films of linear PS were investigated on rectangular bubbles. The modulus of the thin film rectangular bubbles was analyzed by approximation methods. The inflation of rectangular bubbles was simulated by finite element analysis (FEA). The mechanical properties of the thin films with the same thickness for circular and rectangular bubbles are compared and we find that the rubbery plateau compliance is geometry independent. We also investigated the creep behaviors of ultrathin films of 3-arm star PS on circular bubbles. We find the rubbery plateau compliance is molecular architecture independent.

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Date submitted: 08 Dec 2010 Electronic form version 1.4