Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Ellipsometry studies of nanofilled polymer thin films. UFUK KARABIYIK, ALAN ESKER, Department of Chemistry (0212), Virginia Tech Blacksburg, VA 24061 — Thermal properties of polymer thin films and polymer/nanofiller blends are crucial and expected to be different from their corresponding bulk properties because of the large surface area/volume ratio and the greater fractional free volume in confined geometries. Langmuir-Blodgett thin films of trisilanolphenyl-POSS (TPP) and poly(t-butyl acrylate) (PtBA) blends were prepared by Y-type deposition. The films have been characterized by x-ray reflectivity and ellipsometry. Ellipsometry is able to measure thermally induced structural changes and can be used to monitor surface glass transition temperatures as well as layer deformation in multilayer thin films. The results show that TPP depresses the glass transition temperature(Tg) of PtBA LB-films like a plasticizer at low TPP concentrations less than 3 wt. percent TPP and that Tg increases for TPP concentrations greater than 3 wt. percent. A speculative mechanism for this cross-over is an increase in TPP aggregation that pins PtBA chains leading to lower chain mobility at higher wt. percent TPP.

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Date submitted: 30 Nov 2005 Electronic form version 1.4