Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Free Surface and Interfacial Effects on Tg Confinement Behavior of Template Supported Nanotubes[1] ANTHONY TAN, Northwestern University — Free surface and interfacial effects have a large impact upon the magnitude and direction of Tg-confinement behavior for nanoscale materials. In this work, we study the Tg behavior of supported polymers in anodic aluminum oxide templates. The effects of attractive and neutral or non-interacting polymer substrate interactions were investigated. Tailored wall thicknesses were achieved using template melt infiltration by varying the annealing temperature and the molecular weight of the polymers. Nanotube thickness can be related to the polymer conformation and the interactions between the polymer and the substrate. Substantial Tg reductions as a function of wall thickness were observed for supported polystyrene nanotubes and Tg increases for supported poly(methyl methacrylate) or poly(2-vinylpyridine) nanotubes. The Tg-confinement behavior of supported nanotubes is found to be similar to the behavior of supported thin films in the presence or absence of interfacial effects.

[1]National Science Foundation Graduate Research Fellowships Program

Anthony Tan
Northwestern University

Date submitted: 14 Nov 2014 Electronic form version 1.4