Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of Single-Walled Carbon Nanotubes on Glass Transition Behavior in Polystyrene BRIAN GRADY, University of Oklahoma, WARREN FORD, ABHIJIT PAUL, Oklahoma State University — Our group previously investigated (Macromolecules, 2009, 42, 6152) the effect of nanotube addition on the glass transition temperature (Tg) and the heat capacity change at the glass transition (Delta Cp). Tg increased with nanotube addition by $\sim 7^\circ$C at 1 wt% added nanotubes, while the delta Cp had the same qualitative behavior, but with a $\sim$20% decrease instead of an increase. We have extended this work to polymer grafted-to nanotubes, with polystyrene molecular weights of 2800, 15,000 and 50,000 g/mol; the weight fractions of grafted chains were approximately the same. For the two higher grafting densities, Tg showed the same qualitative behavior but quantitatively the increase in Tg was closer to 9°C. Composites with 50 K grafted nanotubes were statistically identical in terms of the Tg and Delta Cp, although the latter at high nanotube concentrations (20 wt%) did show some anomalous behavior. The decrease in Delta Cp for composites made with the nanotubes having the highest grafting density was linear with added grafted nanotubes to a maximum of a $\sim$35% decrease. Delta Cp for the materials made with 15 K grafted nanotubes showed either a small decrease, or no change in Delta Cp.

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Date submitted: 09 Nov 2010 Electronic form version 1.4