Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Crystallization and orientation studies in SWNTs based nanocomposites TIRTHA CHATTERJEE, University of Houston, RAMANAN KRISHNAMOORTI, University of Houston, VIKTOR HADJIEV, University of Houston — Single walled carbon nanotubes (SWNTs) based polymer nanocomposites are attractive for their improved mechanical, electrical and thermal properties. We have obtained well-dispersed SWNTs samples in two semi-crystalline polymers poly(ε-caprolactone) and poly(ethylene oxide) respectively. Initial crystallization studies show tubes acts as a nucleating agent for PCL where as it hinders nucleation of PEO crystals. Both polymer composites are studied for aligned SWNTs samples. Raman spectroscopy studies show SWNTs are aligned along the draw direction. The crystallization studies of the aligned nanocomposites are performed using synchrotron small angle x-ray scattering (SAXS). Our studies reveal that for an aligned tube direction polymer crystals arrange themselves in a particular orientation. For PCL the lamellar normal is parallel to the tube axis where as for PEO it is perpendicular to the draw direction. As SWNTs act as a nucleating agent for PCL, chains grow parallel to the draw direction. For PEO, SWNTs act as barriers and polymer lamellae grow parallel to the SWNTs axis. This observation is interesting because oriented tubes can be used as a template to orient polymer crystals.

Ramanan Krishnamoorti
University of Houston

Date submitted: 30 Nov 2005 Electronic form version 1.4