

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Polymer Chain Conformation in CNT/Polystyrene Nanocomposites by SANS** WEI-SHAO TUNG, University of Pennsylvania, VIKKI J. BIRD, University of Durham, NIGEL CLARKE, University of Sheffield, RUSSELL J. COMPOSTO, KAREN I. WINEY, University of Pennsylvania — Polymer conformations are a critical factor that affects the performance of polymer nanocomposites. Using small angle neutron scattering, we probed chain conformations and confinement of polymers in both SWCNT/polystyrene ( $R_{SWCNT} < R_g$ ) and MWCNT/polystyrene ( $R_{MWCNT} \sim R_g$ ) nanocomposites. Through contrast matching experiments, we optimize the dPS:hPS ratio (0.725:0.275) to minimize the scattering from CNTs. To fit the scattering data, we developed a fitting model that includes scattering from polymer chains, rod networks, and defects. We found that the rod network scattering increases as the CNT concentration increases (0.3wt% - 10wt%) in both SWCNT and MWCNT composites, and the rod network scattering is much higher for SWCNT due to the smaller mesh size. When the CNTs concentration is below 2wt%, there is no significant change in  $R_g$  for both SWCNT and MWCNT nanocomposites. Above 2wt%, the  $R_g$  for SWCNT nanocomposites increases monotonically as a function of CNT concentration ( $\sim 30\%$  increase for 10wt% SWCNT loading), while the  $R_g$  for MWCNT is not affected.

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Date submitted: 19 Nov 2012

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