

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Physical Characterization of Hierarchically Structured Nanocomposites** ROSS BEHLING, ERIC COCHRAN, Iowa State University — In this contribution we present various aspects of the thermodynamics of self assembly in block copolymer / layered silicate nanocomposites (BCPLSs). Hierarchically structured BCPLSs were prepared using an *in situ* atom transfer radical polymerization (ATRP) approach. The three part synthesis of the materials included an ion exchange functionalization of the clays, sonication during styrene (St) polymerization, and a block copolymer *tert*-butyl acrylate (tBA) synthesis. Highly organized lamellar structures were formed with a periodicity of  $\sim 200$  nm, much larger than the  $\sim 35$  nm periods of bulk block copolymers of comparable molecular weights. The final material had two distinct glass transitions (Tg)  $69^\circ\text{C}$  for the tBA and  $103^\circ\text{C}$  for the St. This is a significant Tg enhancement for atactic tBA (Tg =  $42^\circ\text{C}$ ) and is attributed to the chain extension which occurs in the confined geometry of the silicate sheets.

Ross Behling  
Iowa State University

Date submitted: 26 Nov 2007

Electronic form version 1.4