

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Chain conformation and crystallization in PEO / layered silicate nanocomposites SPIROS H. ANASTASIADIS, K. CHRISOPOULOU, S. BOLLAS, Foundation for Research and Technology-Hellas and Univ. of Crete, Heraklion Crete, Greece, K.S. ANDRIKOPOULOS, S. FOTIADOU, Aristotle University of Thessaloniki, Greece, G.A. VOYIATZIS, Institute of Chemical Engineering & High Temperature Chemical Processes, Patras, Greece — The polymer chain conformation under confinement and the polymer morphology are investigated in hydrophilic PEO/Na⁺-montmorillonite nanohybrids synthesized by melt and/or solution intercalation. Intercalated hybrids with mono- and bi-layers of PEO chains are obtained for all compositions covering the complete range from pure polymer to pure clay. For low polymer concentrations, where all the polymer chains are intercalated, PEO is purely amorphous. As PEO concentration increases further, the polymer chains adsorbed on the outer surface of the clay particles remain amorphous as well. It is only when there is large amount of excess polymer outside the completely filled galleries that the bulk polymer crystallinity is abruptly recovered. The conformation of the confined or adsorbed polymer chains, as probed by Raman and FTIR spectroscopies, is found more disordered than the PEO melt even at higher temperatures; this is evident by the dramatic increase of the gauche conformations of the C-C bond along the chain backbone. Sponsored by the Greek GSRT (*ΣΥΝΕΠΤΑΣΙΑ*; 09ΣΥΝ – 42 – 580) and by the EU (CP-IP 246095-2).

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Date submitted: 07 Nov 2011

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