Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

The amount of immobilized polymer in PMMA SiO_2 nanocomposites determined from calorimetric data CHRISTOPH SCHICK, ALBERT SARGSYAN, ANDREAS WURM, University of Rostock, Germany, SEVAN DAVTYAN, ANAHIT TONOYAN, SEUA, Yerevan, Armenia — The existence of an immobilized fraction in PMMA SiO_2 nanocomposites was shown on the basis of heat capacity measurements at the glass transition of the polymer. The results were verified by enthalpy relaxation experiments below the glass transition. The immobilized layer is about 2 nm thick at low filler content if agglomeration is not dominant. The thickness of the layer is similar to that found in semicrystalline polymers and independent from the shape of the nanoparticles. Nanocomposites therefore offer a unique opportunity to study the devitrification of the immobilized fraction (RAF) without interference of melting of crystals as in semicrystalline polymers. It was found that no devitrification occurs before degradation of the polymer. No gradual increase of heat capacity or a broadening of the glass transition was found. The cooperatively rearranging regions (CRR) are either immobilized or mobile. No intermediate states are found. Sargsyan A, Tonoyan A, Davtyan S, Schick C. European Polymer Journal 2007:43:3113-3127.

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Date submitted: 03 Dec 2007 Electronic form version 1.4