Abstract Submitted
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Thermal Features and Glass Transition in Polystyrene-Nanodiamond Composites ALIN CRISTIAN CHIPARA, THOMAS MION, RAFAEL VILLEGAS, KAREN LOZANO, DORINA MAGDALENA CHIPARA, STEVEN TIDROW, MIRCEA CHIPARA, The University of Texas Pan American — Polystyrene-Nanodiamond composites were obtained by dissolving the polymeric matrix into a theta solvent (cyclohexane) followed by the addition of diamond nanoparticles from Aldrich (with a particle size ranging between 3 and 8 nm) and subsequent sonication for about 100 minutes by using a Hielscher high power (1 kW) sonicator. The homogeneous solution was poured onto microscope slides and the solvent has been removed by heating in an oven at 125 ^{o}C for about 3 hours. Composites containing various amounts (from 0 % to 25 % nanodiamonds within polystyrene) have been investigated. The physical properties of the as obtained nanocomposites were investigated by DSC, TGA, Raman, and WAXS. Glass transition temperature was shifted to higher temperatures and the thermal stability was enhanced by the addition of nanodiamonds. A phenomenological model for the observed changes is proposed (within the free volume approximation) and discussed in detail. Acknowledgements: This research was supported by US Army Research Laboratory (W911NF-08-1-0353) and LSAMP -UTPA.

Mircea Chipara
The University of Texas Pan American

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