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Glass Transition in Polystyrene – TiO2 Nanocomposites ANDREEA ARGUELLES, THOMAS MION, ALIN CRISTIAN CHIPARA, JOHN HAMILTON, LOZANO KAREN, DORINA MAGDALENA CHIPARA, STEVEN TIDROW, MIRCEA CHIPARA, The University of Texas Pan American, DAVID HUI, University of New Orleans — Polystyrene is a typical amorphous polymer with almost no crystallinity degree. The addition of very small particles to polystyrene is expected to change significantly the mechanical and thermal features of this polymer due to the competition between the macromolecular chains and the nanofiller for the same cluster of free volumes. The shift of the glass transition temperature and of the associated mechanical properties is expected to increase as the particle size is reduced. Anatase nanoparticles from Aldrich, with an average diameter of 15 nm have been dispersed within PS. To achieve a homogeneous distribution of nanoparticle the polymer was dissolved within a theta solvent (cyclohexene), the solution has been sonicated for about 100 minutes, and the solvent has been evaporated by heating at 125 °C for few hours. Thermal characteristics of composites containing various fractions of anatase were measured by TGA, DSC, and DMA. The research was focused on the shift in the glass transition temperature of polystyrene due to the loading with nanoparticles. Acknowledgements: The research was supported by the Welch Foundation, Air Force Research Laboratory (FA8650-07-2-5061), and US Army Research Laboratory/Office (W911NF-08-1-0353).

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