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Relaxation Dynamics of the Glass Transition in PMMA+SWCNT Composites by Temperature-Modulated DSC NIHAR PRADHAN, Department of Phys, Worcester Polytechnic Institute, Worcester, MA-01605, USA, GERMANO IANNACCHIONE — Temperature Modulated Differential Scanning Calorimeter (TMDSC) used to investigate the thermal relaxation dynamics of PMMA-Single wall carbon nanotubes (SWCNTs) through the glass transition as a function of frequency. A strong dependence of the temperature dependence peak in imaginary part of complex heat capacity (T_{max}) was found during the transition from glass like to liquid like region and can be described by Arhenius law. The activation energy shows increases while the charactersistic time decreases with increasing mass fraction (ϕ_m) of SWCNTs. Decreasing of enthalpy, while heating and slowly increasing while cooling at 2.0 K/min scan rate was observed and as frequency of temperature modulation increases. There is no relative change of enthalpy in heating and cooling observed at sufficiently slow scan rate. The glass transition temperature (T_g) shows increases as a function of frequency of temperature modulation, ϕ_m of SWCNTs and with increasing scan rate. From imaginary part of heat capacity, it obvious that T_{max} is not the actual glass transition temperature of pure polymer but T_{max} and T_g values can be superimpose when ϕ_m of SWCNT increases in polymer.

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