

Abstract Submitted  
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**Interfacial and random field effects in polymers filled with nanoparticles** FOUAD ALIEV, VLADIMIR DOLIDZE, IVAN JOEL LOPEZ, University of Puerto Rico — We report on the influence of filling of poly(n-alkyl methacrylates) with nanoparticles on glass transition and relaxation processes in as investigated by dielectric spectroscopy and DSC. In order to estimate the role of interfacial effects at nanoparticle-polymer interface we used two types of Aerosil particles: with hydrophilic and hydrophobic surfaces. The agglomeration even of 2-3 volume percent of Aerosil particles in polymer forms a 3D-network dividing the polymer into random domains with liner size of several hundred nm, depending on the concentration of filling particles. The result of the filling of polymer is at least two fold: random field effects imposed by network and very developed area of the particles surface imposes interfacial effect on polymers. The relaxation times of  $\alpha$ -relaxation process (sensitive to glass transition) in both filled polymers are faster than those of bulk polymers measured at the same temperatures. This might be interpreted as reduction of glass transition temperature in filled polymers. Semi-quantitatively this reduction is in accordance with the Vogel-Fulcher data analysis of the temperature dependencies of  $\alpha$ -processes relaxation times and with results of DSC experiments. We assign observed influences of nanoparticles on polymer to interfacial effects. The influence of random field is less important in glass forming systems due to their internal random structure.

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