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Relaxation and Glass Transition in Confined and Filled Polymers. VLADIMIR DOLIDZE, EDWIN ARROYO, MANUEL RIVERA, FOUAD ALIEV, University of Puerto Rico — We report the results of the investigations of the influence of confinement and filling of polymers with nanosize aerosil particles on the glass transition and dynamics of the α- and the β-relaxation processes in poly(octylmethacrylate) (POMA) by dielectric spectroscopy dynamic light scattering and differential scanning calorimetry. The polymer was synthesized directly in pores of the porous glass matrix with interconnected and randomly oriented pores with an average pore size of 100 nm by free radical polymerization of the monomer. Both the α- and the β- processes were observed in confined polymer. We found that confinement is resulted in the reduction of the glass transition temperature T_g of the polymer. This change in T_g was mainly due to the existence of a developed pore wall-polymer interface and difference in the dynamic behavior of polymer in the surface layers compared to that in the bulk. The random structure of the host media was less important. Variations of size of filling particles and their concentration are helpful in understanding of relaxation properties at polymer – solid interface as well as a role of surface interactions in glass transition.

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