

Abstract Submitted
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Dynamics of Methyl Methacrylate Nanoconfined in Silica Sol Glasses Studied by Optical Kerr Effect Spectroscopy¹ DUJUAN MENG, LIANJIE XUE, GEORGE TAMAS, EDWARD QUITEVIS, Department of Chemistry Biochemistry, Texas Tech University, Lubbock, TX 79409, SINDEE SIMON, Department of Chemical Engineering, Texas Tech University, Lubbock, TX 79409 — Nanoconfinement has been found to have an effect on polymerization processes [1,2] and on the glass transition temperature T_g [3]. Here we report studies of the nanoconfinement effect on the dynamics of monomers in the pores of silica sol-gel glass. The samples were prepared under a vacuum and studied by using optical Kerr effect (OKE) spectroscopy. The reorientational dynamics of methyl methacrylate (MMA) confined in silica sol-gel glasses with pore diameters of 32, 41, and 82 Å was studied. The decays of the reorientational correlation function $C(t)$ became longer as the pore size decreased. Based on the analysis of the reorientational correlation functions using a two-state model [4], the nanoconfinement effect is due to the interaction of molecules with the surface of the silica-gel glass. In a study of the effect of nanoconfinement in modified silica sol-gel glasses, which were obtained by refluxing the sol-gel glasses in methanol to give hydrophobic pore surfaces, the decay is faster in the modified silica gel glass than in the unmodified sol-gel glass.

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