Dynamics of cis-1,4 Polyisoprene and 1,4 Polybutadiene confined to Nanoporous Alumina

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We study the effect of confinement of two flexible polymers ,one with attractive interactions with the pore walls (cis-1,4 Polyisoprene) and one with repulsive imteractions (cis-1,4 Polybutadiene), as a function of molecular weight, pore diameter, temperature and frequency. Polyisoprene is a type-A polymer (Stockmayer) and as such it has a dipole moment parallel and perpendicular to the backbone. We employ molecular weights in the range from 300-20.000 g/mol and as confining medium we use self-ordered AAO templates with diameters in the range 400-25 nm. Our main interest is on the effect of confinement on the normal modes and segmental mode. Dielectric spectroscopy measurements over a broad range of frequencies and temperatures revealed a significant broadening of both modes on confinement and a slow-down of the normal mode dynamics in the lowest molecular weight. For the Polybutadiene case we study its behavior under the same confining media using molecular weights in the range from 500-55.00 g/mol. The feature that makes this case different of that of PI is that the segmental mode speeds-up as with decreasing pore diameters.