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Relaxation of Polyisoprene in Nanoscale Confinement SUNG A. KIM, PRAVEEN AGARWAL, LYNDEN ARCHER, Cornell University — This talk introduces a simple model of confined polymers in polymer nanoparticle composites. Most studies about confined polymer dynamics have been investigated from the system of polymers in porous media or the polymer thin film structure. This new class of polymer nanoparticle hybrid materials, termed Nanoscale Ionic Materials (NIMs), is synthesized in bulk scale with convenient controllability of diverse properties to create the confined polymers in nanoscale. cis-Polyisoprene (PI), type A polymer whose dipole moments are parallel along the chain backbone, are synthesized by anionic polymerization and then tethered to spherical silica nanoparticles. Broadband Dielectric Spectroscopy measures responses to the applied electric field which are normal mode relaxation indicative of whole chain relaxation, and also segmental relaxation. We show that relaxations of PI are slower when simultaneously confined and tethered. We also show that molecular weight and grafting density have a profound effect on dynamics of the twice-confined PI chains.



Prefer Oral Session Prefer Poster Session

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