

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Dynamics of the Polyisoprene Matrix with the Addition of Polystyrene-Grafted Gold Nanoparticles HENGXI YANG, PETER GREEN, University of Michigan — The relaxation dynamics of polyisoprene (PI) chains in mixtures of PI, of varying molecular weights, with small quantities ($\varphi \leq 0.5\text{wt}\%$) of polystyrene (PS)-grafted gold nanoparticles is studied using Dielectric Spectroscopy. The normal and segmental dynamics of unentangled PI chains decreased with the addition of the nanoparticles, whereas the dynamics of entangled PI chains remained virtually unaffected. Moreover, we show that with the addition of the NPs, a new relaxation peak, not reported before, appears near the frequency range of the β -relaxation, below 200 K; the β -relaxation remains invariant. The intensity of this new peak, which increases with increasing NP concentration, exhibits a very weak dependence on the temperature. Additionally, the peak shifts approximately one order of magnitude, increasing dynamics, as the molecular weight of PI increases from 10k to 138k. This phenomenon, together with the reported behavior of β -relaxation, reflects the influence of the nano-scale structure of the dynamics of the system.

Hengxi Yang
University of Michigan

Date submitted: 11 Dec 2009

Electronic form version 1.4