

Abstract Submitted  
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**Segmental Dynamics of Polymer Nanocomposites by Dielectric Relaxation Spectroscopy** SHUSHAN GONG, QUAN CHEN, RALPH COLBY, JOSEPH MOLL, SANAT KUMAR, None — The addition of nanoparticles dramatically affects the physical properties of polymer melts. The general agreement on this interaction mechanism is that the polymer-filler interface is the key region for the changes of properties. Previous studies have suggested the existence of a bound polymer layer in this interfacial region by various techniques. Here, we use Dielectric Relaxation Spectroscopy (DRS) to study the segmental relaxation of poly-2-vinylpyridine (P2VP) nanocomposites by the presence of silica nanoparticles (NPs), with sizes ranging from 14nm to 100nm. For nanocomposites with large amounts of surface area per unit volume (i.e., 14 nm NPs at high loadings) the segmental relaxation dispersion is broadened significantly, suggesting that the bound layer of P2VP is slower than the bulk P2VP, which is attributable to a restriction from solid surface of NPs. Additionally, the thickness of the bound polymer layer is estimated from the reduction in the magnitude of the segmental relaxation.

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None

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