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Critical Effect of Segmental Dynamics in Polybutadiene / Clay Nanocomposites Characterized by Solid State 1H NMR Spectroscopy[1]

XIAOLIANG WANG, Nanjing University, RONGCHUN ZHANG, PINGCHUAN SUN, Nankai University, H. HENNING WINTER, University of Massachusetts, Amherst, Massachusetts, GI XUE, Nanjing University — The segmental dynamics of rigid, intermediate, and mobile molecular components in end-functionalized polybutadiene (PB) / organo-clay systems was characterized by fully refocused 1H NMR FID. In addition, 1H DQ NMR experiments allowed to semi- quantitatively monitor changes in segmental dynamics near the interface. Both methods suggested a critical concentration of end-functionalized polybutadiene, indicating a saturation effect for the surface-adsorbed polymer. The critical concentration depended on molecular weight of PB and PB-clay interaction. Based on the 1H NMR results, a tentative model was proposed to illustrate the evolution of the structure and segmental dynamics in PB/organo-clay nanocomposites.

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