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Phase state and molecular mobility of segmented polyurethanes

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Abstract

Spin-lattice and spin-spin NMR relaxation was studied in a series of segmented polyurethanes based on poly(diethylene glycol adipate), 2,4-tolylene diamine, and 2,4-toluene diisocyanate. It was concluded that NMR relaxation is determined by physical interactions between rigid blocks and also between rigid and flexible blocks. The dependence of the degree of segregation on the molecular weights of rigid and flexible blocks was determined. A quite high degree of segregation in the investigated systems and the related manifestations of individual features of flexible blocks enabled to follow the dynamics of the molecular chain with fixed end and study variation of the glass transition temperature and the activation energy of the segmental motion of this chain as a function of its molecular weight.