

13. V. P. TRIVALKO, Thickness of Chain and Conformation of Polymers in the Crystalline State, *Macromolecules* **13**: 370, 1980
14. R. F. BOYER and R. L. MILLER, Korrelyatsiya mezhdu konstantoi C_2 v uravnenii Muni-Rivlina i chislom atomov v tsepi mezhdu fizicheskimi zatsepleniyami (Relationship Between Constant C_2 in the Mooney-Rivlin Equation and the Number of Atoms in the Chain Between Physical Entanglements) *Trans. Internat. Conf. on Rubber and Vulcanisates*, vol. 1, A₃, Kiev, 1978,
15. J. J. BURKE and V. WEISS Ed.), *Block and Graft Copolymers* p. 15, Syracuse Univ., N.Y., 1973

A ANALYSIS OF MECHANISMS OF ROTATIONAL MOTION OF POLYBUTADIENE MACROMOLECULES*

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Times of spin-lattice, spin-spin and effective relaxations in the MW-4 sequence averaging dipole interaction have been measured in the temperature range 170–320°K for eight polybutadiene specimens with MW in the range 10^3 – 10^6 . An analysis of temperature and MW dependences of the measured relaxation parameters shows that motion of the polybutadiene main chain may be described with the aid of three correlation time spectra corresponding to two anisotropic mechanisms of rotational motion and one isotropic mechanism.

A MODEL of motion characterized by three correlation times was used in [1–3] to describe molecular mobility in polyethylene oxide melts. As regards terminology in [3] the correlation times in their order of increasing length correspond to anisotropic rotation of proton pairs about main chain carbon bonds, to anisotropic reorientation of large chain segments and to isotropic reorientation of the macromolecule as a whole. Our aim in the present investigation was to shed light on the motion of polybutadiene macromolecules and to refine the above-described model of rotation on the basis of the present work.

A pulsed NMR method was used to investigate polybutadiene (PB) specimens with a number average MW range from 2000 to 8×10^5 . The isomeric composition of the PB was not determined; its influence was, however, eliminated by comparing relaxation parameters

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