^{13}C and ^{1}H NMR study of Poly(methyl Metacrylate) and Diethylene Glycol Bis Allyl Carbonate (CR-39) containing Lead Acrylate.

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The evaluation of the molecular dynamics of the poly(methyl methacrylate) (PMMA), its copolymer with acrylic acid and its terpolymer with lead acrylate (APb) was carried out due to its importance to obtain polymeric materials with better properties comparing to the conventional polymer. In this work the study of the molecular dynamics of the poly(methyl metacrylate) (PMMA), responsible for the processes of structural relaxation (molecular motions of the main chain and molecular motions of the lateral branch)[1]. Together with a series of metacrylates as copolymers of methyl metacrylate (MMA), acrylic acid (AA) and lead acrilate (APb), these copolymers had variation in the content of APb from 0 to 40%. The proton spin-lattice relaxation times (T_1H) were determined direct though the protons using a low field NMR (RESONANCE) and the spin-lattice relaxation times in rotating frame were performed in high field (VARIAN). The relaxation parameter reflects the structural relaxation. The NMR experiments were accomplished as a function of temperature varying the chemical structure of the polymeric samples. MMA amorphous material as used, because of its non polar main chain and flexible lateral branches formed by polar groups COO and for groups polar substitutions R=OH and Pb[2]. This polymeric family was chosen due to a variation in the size of the group of the monomer AA and APb, that influences its T_g and the molecular dynamics.

Keywords: Magnetic Resonce, Acrylates, copolymers.

[1]Lucas, E.F., B.G. Soares, and E. Monteiro, *Caracterização de Polímeros*. Série Instituto deMacromoléculas. 2001, Rio de Janeiro: e-papers. 366.

[2]Perera, M.C.S., *Solid State NMR Study of Polymer networks based on methyl methacrylate and diethylene-glycol-bis-allyl-carbonate.* Polymer, 1999. **40**: p. 1667-1676.

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