Synthesis and Characterization Process of a Polyurethane Resin (polyol + isocyanate).

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Polyurethane is a polymer resulting from a chemical reaction of polymerization in condensation through two basic components, the polyol and the isocyanate, in association with additives that control and homogenize the result. There are different types of polyurethanes, developed for specific applications, solid or expandable, flexible, elastic, semi-rigid or rigid, where they can take the form of molded articles, pellicle or fibers, with advantages such as resistance chemical and physical, lightness and resilience. However, the PURS industry is highly dependent on oil, because its two main raw materials, polyols and isocyanate, consist primarily of hydrocarbons. Due to environmental concerns and the fact that oil is a nonrenewable raw material, there is a necessity to find solutions that allow the combination of PURS with renewable components. Through the above, the present work aims to synthesize a polyurethane resin from polyol based on castor bean oil with different proportions in mass (1:1.1; 1:1.3; 1:1.6 e 1:1.9) and characterize it through the FTIR, TGA/DTG and DSC chemical tests. Through infrared analysis, it was observed the presence of bands of absorption of the C-O-C groups, as well as the presence of vibrational deformation of the CN, NH, C-H_3, C-H_2 groups and bands related to the vibration of the free isocyanate groups (N=C=O), once the presence of this band confirms that not all isocyanate groups were involved in the reaction to form polyurethane [1]. On the other hand, through the analysis of TGA/DTG, it was observed a stability zone for the 1:1.1 and 1:1.3 proportions up to 223°C and for 1:1.6 and 1:1.9 proportions up to 180°C, as well as the presence of two thermal events of decomposition, and through the DSC curves it was observed a glassy transition region at 288 - 305°C, besides the presence of two endothermic peaks and two exothermic peaks.

[1] S.M. Carvalho, V. Weber, T. N. Silva, P. L. M. Barreto. Characterization of polyurethane based on synthesized polyol from glycerol and hexamethylene diisocyanate. In: 10° Congresso Brasileiro de polímeros, Foz do Iguaçu, (2009).