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Synthesis of Mono-component Sealant: Effect of Mixtures of Silyl-terminated Pre-polymers

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Sealant can be synthesized for multi-component or single-component system and are based in different chemical nature, such as: polyurethane, silicone, polyacrylate, rubber among others. There are six segments for application sealants: building construction, automotive, aeronautical, marine, aerospace, medical and dental. There are many possibilities of formulation and therefore it results in products with a wide range of physical and mechanical properties. The aim of this work is to develop sealants to base of silyl-terminated polymer from mixtures of pre-polymer (A and B) and to study their physical and mechanical properties. The pre-polymers A and B with different molecular weight ($A < B$) were synthesized from polyol of polyoxipropylene of high molecular weight), to 60 °C by 5 hs and nitrogen gas. Then the pre-polymers were silanized with the propyltriethoxysilane group and tin salt as catalyst), to 60 °C by 1 hr and nitrogen gas. Four sealant were prepared A, B, AB82 and AB73, whose composition of pre-polymer silanized mixture used (A/B) were: 100/0, 100/0, 80/20 and 70/30 respectively. After that, filler (calcium carbonate), plasticizer, and additives such as: stabilizers, catalyst, tixotropic agents and adhesion promoter were added and mixtures until obtain a homogeneity. The sealants were characterized by physical and mechanical properties. Preliminary results of tack-free and hardness of the sealant shown a strong influence of pre-polymer composition and filler in the range from 8 to 120 minutes and 46 to 60 shore A respectively. In relation to mechanical properties, the shear strength of these sealants on steel specimen test showed interesting results with values in the range from 12 to 20 kgf/cm². On the other hand, high values of sealants elongation were observed in sealant with mixtures of pre-polymer AB82 and AB73 from 91 to 100 %.