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Effect of Catalyst on Castor Oil Based Polyurethane with Different Hard/Soft Segment Ratio

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Abstract : Environmentally friendly Polyurethane(PU) synthesis from Castor oil(CO) has been studied extensively. Probably due to high proportion of fatty hydroxy acids and unsaturated bond, CO showed better performance than other oil, can be easily utilized as commercial applications. In this work, cured PU polymers having different –NCO/OH ratio with and without catalyst were synthesized by using partially biobased Isocyanate with castor oil (CO). Curing time has been studied by observing at the time of reaction, which can be confirmed by AT-FTIR. DSC has been studied to monitor the reaction between CO & Isocyanates using non Isothermal process. Curing kinetics have also been studied to investigate the catalytic effect of the NCO / OH ratio of Polyurethane. Adhesion properties were evaluated from Lapshear test. Tg of the PU polymer was evaluated by DSC which can be compared by DMA. Surface Properties were studied by contact angle measurement. Improvement of the interfacial adhesion between the nonpolar surface of Aluminum substrate and the polar adhesive has been studied by modifying surface.

Keywords : polyurethane, partially bio-based isocyanate, castor oil, catalyst
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