

Biobased Polyurethane Derived from Transesterified Castor Oil: Synthesis and Charecterization

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Abstract : Recent years has witnessed the increasing demand for natural resources and products in polyurethane synthesis because of global warming, sustainable development and oil crisis. For this purpose, different plant oils such as soybean oil, castor oil and linseed oil are extensively used. Moreover, the isocyanate used for the synthesis of polyurethane is derived from petroleum resources. In this present work attempts have been made for the successful synthesis of biobased isocyanate from castor oil with partially biobased isocyanate in presence of catalyst dibutyltin dilaurate (DBTDL). The goal of the present study was to investigate the thermal, mechanical, morphological and chemical properties of the synthesized polyurethane in terms of castor oil modification. The transesterified polyol shows broad and higher hydroxyl value as compared to castor oil which was confirmed by FTIR studies. The FTIR studies also revealed the successful synthesis of bio based polyurethane by showing characteristic peaks at 3300cm⁻¹, 1715cm⁻¹ and 1532cm⁻¹ respectively. The TGA results showed three step degradation mechanism for the synthesized polyurethane from modified and unmodified castor oil. However, the modified polyurethane exhibited higher degradation temperature as compared to unmodified one. The mechanical properties also demonstrated higher tensile strength for modified polyurethane as compared to unmodified one.

Keywords : castor oil, partially biobased Isocyanate, polyurethane synthesis, FTIR

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