

POLYURETHANE FOAMS FORM
NOVEL SOY-BASED POLYOLS

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ABSTRACT

Polyurethane foams and molded plastic films were prepared by reacting isocyanates with polyols containing 50% of vegetable oil-based polyols and 50% of petroleum-based polyols. The vegetable oil-based polyols included epoxidized soybean oil, epoxidized soybean oil reacted with acetol, commercial soybean oil polyols (soyols), polyols derived from epoxidized soybean oil and diglycerides, etc. The petroleum-based polyols were Voranol[®] 490 for rigid foams and Voranol[®] 4701 for flexible foams in the B-side of foam formulation. For rigid water-blown polyurethane foams, density, compressive strength and thermal conductivity were measured. For flexible water-blown polyurethane foams, density, 50% compression force deflection, 50% constant force deflection, and resilience of foams were determined. A dynamic mechanical spectrometer (DMS) and a differential scanning calorimeter (DSC) were used to characterize the hard segment (HS) and soft segment (SS) ratio and thermal properties of plastic. Various functional groups in both flexible polyurethane foam and plastic film were characterized using Fourier transform-infrared spectroscopy with attenuated total reflectance (FTIR-ATR).