

Physical properties of an amine cured epoxy system with epoxidized soybean oil

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Epoxy resin has a wide range of industrial applications including metal coatings, electronic and electric components, reinforced plastic composites and structural adhesives. Using natural materials in preparing epoxy resin products would be beneficial economically and environmentally. Soybean oil has several unsaturated carbon-carbon double bonds per molecule that can be easily epoxidized. Therefore, in this study, epoxidized soybean oils were prepared by epoxidation of the double bonds of the soybean oil in peroxyacetic acid solutions. The epoxidized soybean oils were analyzed by FTIR. The epoxidized soybean oils were mixed with diglycidyl ether of bisphenol A at different ratios and then cured with stoichiometric amount of ethylene diamine. The cure behaviors of the bio-epoxy systems were investigated by DSC. The physical properties of cured samples were investigated by impact tester, UTM, DSC, TGA and DMA. The thermal and mechanical properties of the epoxy system increased with increasing epoxidized soybean oil content.