

HARNESSING TERPENES FOR THERMOSETTING POLYMERS DEVELOPMENT: SYNTHESIS AND CHARACTERIZATION OF MYRCENE-MODIFIED UNSATURATED POLYESTER

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Myrcene shows great potential for developing new polymer-based materials, potentially matching or surpassing the properties of existing alternatives. This study explores the synthesis and application of a myrcene-based monomer in the synthesis of unsaturated polyesters, aiming to fully understand its impact on the polymerization process, curing stages, and the ultimate properties of the resulting materials. The polymerization involving various quantities of myrcene-based monomer with phthalic anhydride, maleic anhydride, propylene glycol, ethylene glycol, and diethylene glycol demonstrated similar trends in conversion rates, molecular mass, and molecular mass distributions of the produced unsaturated polyesters. Moreover, detailed analysis using ¹H NMR spectroscopy revealed unique characteristics in the chemical structure of myrcene-modified unsaturated polyesters. Additional investigations, including rheological tests, dynamic and isothermal differential scanning calorimetry, dynamic mechanical analysis, and thermogravimetric analysis, provided deeper insights into the relationship between the developed macromolecular structures and their final performance. These analyses examined the curing behavior, thermomechanical properties, and thermal stability of myrcene-modified unsaturated polyesters, both as solutions in styrene and as highly cured materials.

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