

Synthesis and characterization of bio-based UPR resins, based on renewable monomers

Ioanna Koumentakou^a, Lazaros Papadopoulos^a, Dimitrios Bikiaris^a, Dimitra Patsiaoura^b, Kostantinos Chrissafis^b, Charles Markessini^c, Eleftheria Athanasiadou^c, and Electra Papadopoulou^c

^a Laboratory of Organic Chemical Technology, Department of Chemistry, Aristotle University of Thessaloniki, GR-54124, Thessaloniki, Greece

^b Solid State Physics Section, Physics Department, Aristotle University of Thessaloniki, GR-54124, Thessaloniki, Greece

[iwanna.koumentakou@gmail.com](mailto:iwana.koumentakou@gmail.com)

^c CHIMAR HELLAS SA, 15 km National road Thessaloniki-Polygyros, 57001 Thermi, Thessaloniki, Greece

Unsaturated polyester resins (UPRs) represent a milestone in the development of the plastics industry. Early examples were synthesized in the early 1900s and in the 1930s, the precursors of today's resins were reported. Unsaturated polyester resins are produced by reacting unsaturated and saturated acids/anhydrides with diols or oxides. The generic process to obtain UPRs is divided in two main steps: the synthesis of the UPs and the curing reaction.

We are familiar about rapid growth and improvement in living standards of population worldwide. So there is an urgent requirement of bio-based resins which are produced by renewable monomers. In addition to this, the bio-based resin has many advantages such as low price, universal availability, no biodegradability and low hazard. Succinic acid is a dicarboxylic acid which is a new biobased monomer with a huge market and environmental potential.

This work was based on the production of UPRs from succinic acid. Succinic acid, ethylene glycol and itaconic acid were used to prepare unsaturated polyester resins. The physicochemical properties of the prepared resins were examined with ¹H NMR, FTIR, DSC and TGA. ¹H NMR and FTIR confirm the successful synthesis of the materials. With DSC measurements, parameters of the cross-linking reaction were examined and TGA was used to study the thermal stability of the cross-linked materials.

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