

## A study of the effect of the double bonds' presence on the properties of eco-friendly unsaturated polyester resins (UPRs) based on succinic acid

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### ABSTRACT

In recent years, the accumulation of waste is among the biggest problems of our society. The modern way of life is governed by the use of fossil-based plastics and the inability for proper waste management is steadily diminishing the quality of living. In this environment, attention is drawn to the production of polymers from renewable monomers, the so-called bio-based polymers. Among others, UPRs are one of the most used polymer classes, due to the simplicity of their processing and the variety of fields that they are applied to. So, a demand for bio-based UPRs was also created. A UPR consists of an unsaturated polymer matrix that is then mixed with an unsaturated monomer called reactive diluent, with which after a thermally or UV induced curing forms a cross-linked network. Tinkering with the properties of either the resin or the reactive diluent can result in materials with different properties suited for different applications. In general, a bio-based UPR should meet criteria for hazardless raw materials, low cost and a performance equal or superior to the materials currently in use, in order to maintain sustainability in the chemical industry. In this work, UPRs partially based on biobased monomers were prepared. Succinic acid, PEG200 and maleic anhydride were combined to synthesise the resins and acrylic acid was used as the reactive diluent. The curing of the resins was thermally induced. Several characterization methods were utilized to examine physicochemical properties of the materials and how the difference of the maleic anhydride/ succinic acid ratio influenced their performance.

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