

# **Polymeric bio-resins based on fast pyrolysis bio-oil**

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## **Abstract**

The use of biomass-based resources is currently a hot topic for both academic and industrial research as an alternative to mitigate the strong dependence on fossil carbon in the chemical and petrochemical industries. The U.S. Department of Energy (DOE) and the U.S. Department of Agriculture (USDA) have prioritized the development of bioenergy and bio-products; and they have the goal to produce 18% of the current U.S. chemical commodities from biomass by 2020, and 25% by 2030. The macromolecular chemistry based on lignocellulosic feedstock represents one of the answers to the quest for polymeric materials capable of replacing their fossil-based counterparts. In particular, fast pyrolysis bio oil is an excellent candidate for the bio-sourcing of polymeric resin. Their competitive cost, worldwide availability and built-in functionality have catapulted its use as a source of macromonomers for polymer applications. The development of this area has been carried out mainly through the reaction and functionalization of hydroxyl groups in the bio oil to produce thermosetting resins such as: epoxy, phenolic, polyurethanes, etc. Thus, the main purpose of this project is to cover the major aspects related to the chemical synthesis, physical-chemical characterization and study of thermo-mechanical properties of bio-based resin, where highly functionalized components are synthesized by chemical modification. Results showed that this new bio-based polymeric systems display interesting properties that are close to their commercial counterparts.