

Bachelor's Thesis, Term Paper, Master's Thesis

Material characterization of reactive thermoplastic composites

Liquid Composite Moulding (LCM) processes for composite parts require resin systems with sufficiently low viscosity to allow proper impregnation of the reinforcement fiber. Typically, this is achieved by using a reactive thermosetting resin system, with inherent challenges regarding reparability and recycling of the matrix materials. Over the last years, reactive thermoplastic resins have emerged that allow the production of thermoplastic matrix composites using LCM processes. Due to their chemistry, these resins (and the composites produced with it) show different mechanical material behavior than conventional thermoset resins which must be thoroughly understood in order to reliably design reactive thermoplastic composite parts.

Topic of this thesis is the mechanical characterization of composite samples produced using a reactive thermoplastic resin system. This includes the analysis of mechanical properties (e.g. Tensile, Shear, Bending) of composite samples and the deduction of process parameters influencing these properties.

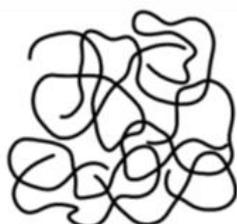


Figure: Structure of an amorphous thermoplastic resin

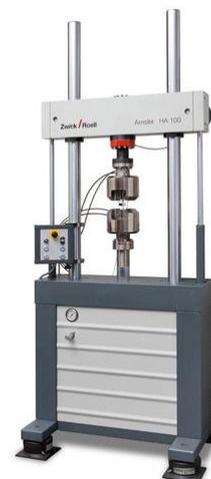


Figure: Universal Testing Machine used for mechanical characterization

Research focus of the thesis

- Literature Review on reactive thermoplastic resins and mechanical characterization of fiber reinforced polymers
- Sample preparation
- Mechanical characterization of samples produced with a reactive thermoplastic resin
- Identification of interdependencies between process and material parameters
- Documentation

Requirements

- Interest and general understanding of composite characterization methods
- Interest and general understanding of composite production processes
- Organized and thorough working style

Note: Please expect a reply only after 20th April 2026.

Starting date: May 2026

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