RenewPoly

Chair of Circular Economy and Sustainability Assessment
TUM Campus Straubing for Biotechnology and Sustainability
Technical University of Munich

Master's Thesis

Life Cycle Assessment (LCA) of FlexFuran System for High-Performance Applications

In high-performance applications requiring excellent fire resistance and thermal stability, conventional phenolic resins still dominate the market. Although these materials are technically reliable, they are neither sustainable nor non-toxic. This is where RenewPoly, a young EXIST-funded startup from TUM, comes in. We develop novel, bio-based, and non-toxic resin systems designed to replace fossil-based phenolic resins—particularly in applications where high flame-retardant performance is crucial—while maintaining strength, stability, and processability.

We are looking for a motivated Master's student to support ongoing research on novel sustainable thermosetting resins for advanced composite applications. Within this project, a newly developed flexible, bio-based resin system (FlexFuran) will be investigated an alternative sustainable resin for the manufacturing fiber-reinforced composites for lightweight and high-performance structures.

The goal of this work is to evaluate the environmental performance of the FlexFuran resin system through a comprehensive **Life Cycle Assessment (LCA)**. The study will compare the bio-based system with conventional phenolic resins, identifying environmental benefits, trade-offs, and key impact drivers across the life cycle.

Tasks

- Conduct a Life Cycle Assessment (LCA) of the FlexFuran resin system
- Define system boundaries, functional units, and scenarios
- Collect and analyze inventory data (raw materials, processing, transport, etc.)
- Perform impact assessment using relevant LCA software (e.g., Brightway/Activity Browser)
- Compare results with conventional phenolic resin systems
- Identify hotspots and propose strategies for improving sustainability

Requirements

- **Good knowledge of Life Cycle Assessment (LCA) methodology**
- **Being enrolled at SoM, SoLS, TUMCS**
- Interest in sustainable materials and composites
- Structured and independent working style
- Experience with LCA tools is a plus

Starting date: Now

For more details please contact:

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