Analysis of adhesion properties of recycled fibers using commercial sizing and polymer matrix

Project Type: Master semester project (Spring 2025)

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Recycled fibers from composite materials are pivotal for sustainable manufacturing across industries such as Construction and automotive. Processes like pyrolysis enable fiber recovery; however, their compatibility with new polymer matrices must be rigorously assessed. Sizing agents are critical in improving fiber-matrix adhesion, restoring the performance of recycled fibers, and enabling their reuse within new composites.

This project aims to evaluate the effect of various commercial sizing agents on the adhesion properties of recycled fibers when used with different polymer matrices, including epoxy and polyester.

The project will involve:

Experimental skill acquisition

- Fiber surface cleaning and surface treatment
- Applying commercial sizing agents to recycled fibers obtained through pyrolysis
- Fabrication of composites using textiles fabricated from treated recycled fibers

Characterization and Mechanical Testing

- Micro-bond test: Evaluate the interfacial shear strength (IFFS) at the fiber-matrix interface
- Tensile and flexural characterization of composites

The tasks will be tailored to the student's skills and interests, ensuring a focused and impactful contribution to the advancement of recycled composite materials.

This project is collaborating with an industrial partner to align with commercial requirements, assessing scalability and feasibility for industrial applications.

Confidentiality

As this project is part of an industrial collaboration, the student will be required to sign a nondisclosure agreement (NDA) before starting the research.