Institut für Textiltechnik und Lehrstuhl für Textilmaschinenbau
RWTH AACHEN UNIVERSITY

Project title:	Modelling and evaluation of end-of-life scenarios for textile waste streams using the example of polyester used textiles [EOL Modell]
Partner:	RWTH Aachen University - Institute for Textile Technology and Institute for Fluid Process Engineering (AVT.FVT)
Duration:	06/2022 – 05/2024
Funding Agency:	AiF/IGF

Univ.-Prof.
Prof. h.c. (Moscow State Univ.)
Dr.-Ing. Dipl.-Wirt. Ing.
Thomas Gries
Director

Amrei Becker
Researcher

Ref.: AB
22.07.2022

Mission Statement

Due to new legislation, rising disposal costs and technological innovations, the recycling of textile waste in Germany, Europe and worldwide will change permanently in the coming years. Various end-of-life (EOL) scenarios are used for textile waste today. In addition, future technologies, such as chemical recycling processes, are being developed for waste treatment. These have to be integrated into the already existing textile recycling market.

The aim of this project is the modelling and evaluation of end-of-life scenarios for textile waste streams using the example of used polyester textiles with different qualities. The model developed enables companies to classify their existing or to-be-developed technologies and/or textile polyester waste streams in the textile recycling market.

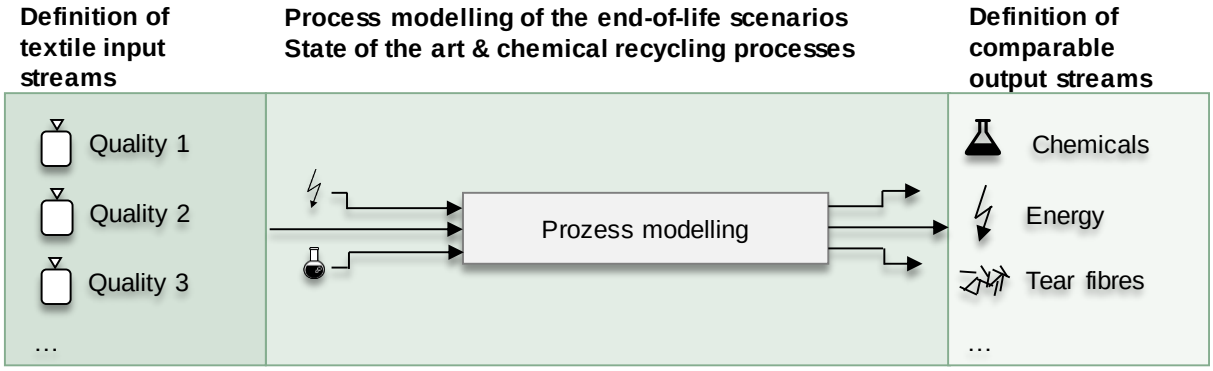

Figure 1: EOL Modell **Schematic representation of the investigation framework of the project**

Approach

Within the framework of the project, four selected processes already established on the market are compared with three innovative chemical recycling processes, see Figure 2.

State of the Art *Modelling on literature values (AVT, ITA)* • Waste incineration • Solvolysis • Regranulation • Tearing	**Chem. Recycling** *Process development, implementation and model validation (AVT)* • Hydrolysis • Aminolysis • Glycolysis/ Alcoholysis

Figure 2: Comparison of the end-of-life scenarios considered

The end-of-life scenarios are modelled using selected life cycle assessment methods (DIN EN ISO 14040/44). After the definition of textile polyester input streams, the chemical and mechanical recycling processes as well as the further end-of-life scenarios are modelled. In addition, the most promising chemical recycling processes will be investigated simulatively and experimentally for their sensitivity to textile-typical impurities.

Table 1: Work Plan

WP 1 Model formulation for life cycle assessment
WP 2 Process development for chemical PET recycling
WP 3 Experimental Recyclingtrials
WP 4 System development - Life Cycle Assessment
WP 5 Evaluation

Acknowledgement

The IGF research project No. 22269 N/1 is funded by the Federal Ministry for Economics and Climate Action within the framework of the programme for the promotion of joint industrial research and development (IGF) on the basis of a resolution of the German Bundestag.

Gefördert durch:

Bundesministerium für Wirtschaft und Klimaschutz

aufgrund eines Beschlusses des Deutschen Bundestages

Contact

Institut für Textiltechnik (ITA) der RWTH Aachen University

Amrei Becker, M. Sc.

Otto-Blumenthal-Straße 1, 52074 Aachen

Tel.: +49 (0241) 80 - 24708

Fax: +49 (0241) 80 - 22422

E-Mail: amrei.becker@ita.rwth-aachen.de