Cellulose Fiber Conference 2025

LIST Technology AG
CH-4422 Arisdorf
Switzerland

Phone +41 61 815 30 00

Web www.list-technology.com
Mail info@list.ch

MWST-Nr.: CHE-321.261.275 MWST

Manuel Steiner
Director Business Development
Tel. +41 61 815 30 76
manuel.steiner@list.ch

LIST Abstract

Technology for recycling of (poly)cotton and enabling polyester-free textiles

The cotton fiber production capacity is a multiple of today's (wood-based) MMCF production. Due to the global limitation of cotton production capacities, a significant increase of cellulosic fiber production may only be achieved by a drastic increase of MMCF production. This requires a multiplication of biomass capacities for MMCF which - today – are mostly forestry based. However, the textiles made from cotton and MMCF themselves bear a huge potential as biomass source for MMCF production being an alternative to wood. This potential can even be multiplied by re-recycling.

Today's textile recycling technologies are mostly still limited to the low hanging fruits such as white cotton bed sheets while fiber blends such as polycotton remain a struggle. Even small amounts of non-cellulosic fibers pose an issue for achieving circularity in the textile industry. Most prominent are the polyester sewing threads used to meet the high tenacity requirements for seams in all types of garments. Several industrial solutions for collecting and sorting textile waste have been developed over the past years. Typically, these include the generation, identification and sorting of textile shreds by color and composition. But ensuring that MMCF and cotton-based textile shreds are free of polyester sewing threads remains a challenge, creates impurities and increases reject amounts.

The presentation will show how Lyocell fibers can be produced to achieve a tenacity which is close to that of polyester. This allows to make MMCF and cotton-based textiles with polyester-free sewing threads, and thus enables fully polyester-free textiles. With respect to upcoming regulations, this presents an important step towards textile circularity.

The presentation will also give an overview of different recycling approaches for textile blends of cellulosic (cotton or MMCF) and synthetic fibers showing an additional path to enabling circularity.

As such processes depend on the specific combination of synthetic and cellulosic fiber types, they need to be developed and adjusted specifically. One important factor in choosing a processing technology is the specific rheological behavior of textile scrap and fiber waste featuring solid and liquid characteristics, high sensitivity to compression as well as large volumes. Therefore, process intensification is one of the key factors for successful scale-up. However, lab scale development traditionally uses non-scalable technology, which poses a challenge when needing replacement to upscale the process to an economically viable plant.

The presentation will inform researchers and developers about an R&D-platform for such developments at a lab scale and the general processing capabilities for textile materials. Specifically, processing products with said tricky rheology while still being scalable to world-scale. Video- and photographic illustration will be included.

Since the 1960-ies, LIST technology has been a development platform well-known in the chemical industry for scalable polymer synthesis and difficult thermal separation applications due to its capability to handle phase changing processes passing liquid, sticky, and solid stages in a single continuously operated equipment. The same capabilities can be used to enable textile recycling.

The presentation will be held by the R&D Engineer Judith Günther.