ARC Advanced Recycling Conference 2025

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Title:

Processing Technology for the Elephant in the Room: Chemical Recycling of Mixed Textiles

Bullet Items:

- About the elephant in the room of chemical recycling: Chemical recycling of textiles
- An overview of different recycling approaches for textile blends made from synthetic and cellulosic fibers
- A processing platform for continuous various chemical textile recycling processes of textile shreds which is scalable from lab-scale to world-scale.

Abstract:

While plastics recycling is discussed at many conferences on chemistry and advanced recycling based on EU regulations, these conferences focus primarily on bottles and packaging and are often silent on textile recycling - even though most PET is used for fibers, not bottles, and even though the need for textile recycling solutions is widely known and an important topic of EU regulations, thus the elephant in the room.

While industrial solutions for collecting and sorting textile waste and mechanical textile recycling have been developed over the past years, chemical textile recycling processing approaches for turning textile waste into new fibers are currently still under development and pose the missing link to textile circularity.

As such processes depend on the specific combination of synthetic and cellulosic fiber types, they must be specially developed and adapted. An important factor in the choice of processing technology is the specific rheological behavior of textile waste, which is characterized by solid and liquid properties, high sensitivity to compression and large volumes. Process intensification is therefore one of the key factors for a successful scale-up. However, lab-scale development traditionally uses non-scalable technology, which is a challenge when a replacement is needed to upscale the process to an economically viable plant.

The presentation will give an overview of different recycling approaches for textile blends made from synthetic and cellulosic fibers that show a way to enable the circular economy.

The presentation will also inform researchers and developers about a technology platform for such developments at a lab scale and the general processing capabilities for textile materials.

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Specifically, processing products with said tricky rheology while still being scalable to world-scale.

The presentation will be supported by processing videos of experiments with said textile shreds.

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 for advanced polymer recycling processes – including textile recycling.

The presentation will be held by Manuel Steiner, Director Business Development, and Leonard Sylla, R&D Engineer, at LIST Technology AG.

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