

Development of textile waste recovery

Mix III: Chemical recycling of blended synthetic textiles - a new source of recycled polyester and nylon

Recent investigations of textile waste flows in Sweden estimate that approximately 7.5 kg textile/person/year are ending up in household waste and is subsequently incinerated. Today, the options for textile recycling are sparse and mainly works for uncolored textiles made from one type of fiber, for example white cotton sheets. But many of our textile products are composed of a blend of materials. There is a lack of recycling methods that can handle this type of blended materials.

The current research project financed by the COWI Foundation targets this challenge. We will address the question on how to recycle clothes from mixed materials. We will develop a chemical recycling process that can separate the different materials in our clothes, focusing on blends of polyester, nylon and stretch. These material combinations are often found in sportswear, underwear, and pantyhose, and are not possible to recycle using present recycling methods. The project will be conducted in two steps. First, different chemical concepts will be investigated, and in the second step a possible industrial implementation of the most promising concept will be laid out.

By development of new chemical recycling methods, blended textiles may be separated and recycled. The recycled raw material may replace fossil resources both in textile and plastic applications. This will diminish our dependency of fossil oil and lower the carbon dioxide released to the atmosphere. Therefore, we will give a positive contribution to the UN Global Goals and a more sustainable world.

Project team and timeline

The cross-disciplinary project team consists of collaboration between RISE Research Institutes of Sweden and COWI Industry division in Sweden and will be coordinated by Cecilia Mattsson from RISE. This collaboration will contribute to a beneficial knowledge transfer and collaboration between RISE's competence within textile development, polymer chemistry and chemical recycling and COWI's competences of upscaling and construction of chemical processes to industrial level. The funded research project is planned for one year and will start in January 2022 and end in December 2022.

Results

This project will contribute to accelerate the development of a green and sustainable process for a future textile waste refinery. At a global perspective, this research will contribute to a future circular handling of synthetic textiles by replacing combustion and landfill of these textiles with a chemical recycling process.