

Fabrics for the circular economy

- ★ It is difficult to remove the chemicals and finishing substances commonly used to enhance sun protection in awnings and outdoor furnishings, which represents a major hurdle in terms of recycling acrylic waste from these products. Researchers in the REACT project are developing a chemical treatment process to enable the re-use of acrylic textile waste, as **Daniele Piga** explains.

A lot of attention in research is focused on developing methods to recover and re-use resources, as European industry seeks to move towards a more sustainable model. With awnings and outdoor furnishings, one major challenge is in removing the chemicals and finishing substances from acrylic textiles that were previously added. "A coating may have been added within the fabric to improve its weather resistance performance. This kind of impurity can be difficult to remove," explains Daniele Piga, a researcher at Centrocot in Italy, a partner in the REACT project. A consortium bringing together seven partners from five countries, the project aims to develop a system of chemical treatments that will enable the re-use of these resources. "The project is focused on a call for the recovery and reuse of secondary raw materials. We are developing a system to remove these finishing substances in order to remove the impurity and get at the secondary raw material," outlines Piga.

Chemical treatment

The project's agenda encompasses research into various different stages of the recycling process, from the classification of waste textiles through to the production of textiles and their eventual use in new products. Based himself at Centrocot, a textile research and testing centre, Piga's focus is on helping to develop the chemical treatment



REACT prototype

removal rate is very high. The fibre is relatively undamaged and the recycled fibre is still very strong," continues Piga.

An entirely recycled fibre does not yet have the mechanical performance characteristics required for fabrics used in awnings and outdoor furnishings, so researchers have reduced the quantity of recycled material and added virgin

project nears its conclusion. "The Technology Readiness Level (TRL) of the project's work is already very high," says Piga.

The treatment process could also potentially be applied on a wider range of fibres, a possibility that Piga and his colleagues in the project are keen to explore. The idea would be to use the same treatment on other fabrics, widening the impact of the project's research. "It's possible to apply this treatment more widely. For example, we are looking into using the treatment process on polyester, which is a different kind of fibre," explains Piga. With less than 1 percent of all textile waste currently recycled, this research could have a significant impact in terms of reducing waste, which is a major motivating factor behind the project's work. "We have developed different prototypes of fabric for different applications," says Piga.

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system. "We are investigating a different kind of process, involving two consecutive stages of treatment in water. The first stage involves a wetting agent and a sequestering agent, and in the second detergent is used," he says. The aim is to remove 90 percent of chemicals added in the finishing process through this system, opening up the possibility of re-using these resources in textile production. "There is a lot of potential in this respect, because the

acrylic. This still represents a significant step towards a circular economy however, where resources are not simply disposed of but rather applied again in production, so reducing waste. "The aim is to re-spin these waste materials and use them to produce new fabric," outlines Piga. A significant degree of progress has been made in this respect, with researchers having already made a chair out of recycled fabric, and a lot of work is going into prototyping as the

REACT

MANAGING THE WASTE ACRYLIC TEXTILES

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