

# From Workwear to Workwear

Jens Oelerich, Sven Kamphuis, Richard A. J. Groeneveld, Gerrit H. Bouwhuis and Ger J. Brinks

[j.j.oelerich@saxion.nl](mailto:j.j.oelerich@saxion.nl)

Smart Functional Materials, Saxion University of Applied Sciences, van Galenstraat 19, 5711 JL Enschede.

<http://saxion.nl/sfm>

## Introduction

Cotton is the most abundant natural fiber in the textiles industry and has been used since the beginning of the industrialization as major raw material for garment production. Considering the enormous burden cotton cultivation has on the environment, the creation of a closed material cycle would most likely decrease this impact significantly.

The workwear industry is a highly demanding industry for fiber and product quality. Workwear is often industrially washed and collected, which gives rise to a stock of discarded workwear that knows no valuable recycling process.

In this project, the SaXcell® (chemical recycling) technology invented at Saxion is applied to recycle worn-out cotton workwear into a virgin SaXcell® fibers. These can be used to construct new pieces of workwear with high quality.



Quality testing  
Economic and ecological  
evaluation

5



SaXcell®  
workwear

Waste  
Overalls

SaXcell® yarn production  
Weaving of workwear fabric  
Workwear confection applying  
design for recycling rules

4

Manual removal of elastic  
and coated parts  
Unraveling of fibers  
Mechanical removal of metal  
parts

1



Virgin  
SaXcell®  
fibers

Unraveled  
fibrous  
waste



SaXcell®  
pulp

Dissolution in NMMO  
Spinning of high quality blue  
SaXcell® fibers  
Production of 100kg fibers

3

Removal of polyester from  
labels and sewing threads  
Reduction of heavy metal  
content  
Adjustment of the degree of  
polymerization

2



## Conclusion

Blue cotton overalls were recycled into blue SaXcell® fibers of high quality.

Metallic and elastic parts need to be removed manually or mechanically before the chemical recycling of the cotton.

Polyester from labels and sewing threads can be removed chemically within the SaXcell® process.

It is possible to produce SaXcell® fibers leaving the blue dyestuff inside the SaXcell® pulp.

Upscaling to big Big scale (100kg) production is in progress.

Project partners:  
Lavans B.V., HAVEP B.V., SaXcell B.V. Frankenhuis B.V.,  
Van den Acker Textielfabrieken B.V., Artofil B.V.



University  
of Applied  
Sciences

