

## Beyond Bottle Recycling: Achieving Full Circularity for Polyester

*Mathias Kirstein<sup>1,2</sup>, Mandy Paschetag<sup>2</sup>, Stephan Scholl<sup>2</sup>*

*<sup>1</sup>RITTEC 8.0 Umwelttechnik GmbH, Brunswick/Germany*

*<sup>2</sup>Technische Universität Braunschweig, Brunswick/Germany*

In order to meet the demand for recycled PET and close the material loop for products that cannot yet be recycled, the implementation of chemical recycling processes in the value chains is being promoted alongside mechanical processes. *matterr's* technology is at the forefront of this transformation, offering an efficient solution for the back-to-monomer recycling of polyester waste.

The recovery of high-quality products from polyester textile waste poses significant challenges due to its diverse compositions and the presence of non-PET components. However, polyester also presents substantial opportunities for circularity.

*matterr's* approach to addressing these challenges technologically with the revolTEX process for textiles and revolPET process for packaging through selective depolymerization and advanced purification and strategically by cooperating with partners along the entire value chain, fostering transparency of material pathways and data on environmental impact, will be presented.

This contribution also gives insights into the recent expansion of the pilot plant, that not only increases the processing capacity but also strengthens the robustness and economic viability of the technology and paves the way for the construction of a large-scale plant. It also provides data for an updated Life Cycle Assessment (LCA) conducted by the Technische Universität Braunschweig. The data shows both the considerable ecological potential in the provision of monomers through the revolPET process compared to the fossil based production route and the significantly improved environmental performance of a circular economy for textiles realized with the revolPET technology.

### RITTEC 8.0 Umwelttechnik GmbH

Friedrich-Seele-Str. 3  
38122 Braunschweig  
Germany

T +49 15123205890  
kirstein@matterr.de  
matterr.de

