

Meeting product quality and sustainability targets in PET/Polyester applications using back-to-monomer recycling

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The demand for recycled PET is constantly increasing due to legislation as well as brand commitments and a green premium, moving producers and retailers to restructure raw material supply chains.¹ To provide a large amount of recycled PET, new recycling pathways will be scaled up. A major contribution is going to be made by back-to-monomer recycling.²

PET-containing post-consumer and post-production packaging and textile waste can be recycled into virgin-like PET using the revolPET®-technology, see figure 1. It uses alkaline depolymerization to break down the polymer chains and recover the monomers terephthalic acid and ethylene glycol. Their reuse for new applications requires drop-in capable quality, which is why the identification of critical quality criteria is crucial. An analysis of the repolymerized PET on non-intentionally-added-substances (NIAS) proves its suitability for food-contact applications. This was shown for recycled PET originating from packaging as well as post-consumer textile waste.

The recycling of materials and the associated defossilization of the raw material supply is one of the key factors for the chemical industry to realize the climate targets set in this sector.³ To achieve this, newly developed technologies must have a significant environmental benefit. Therefore, it is essential to integrate methods such as life cycle assessment into process and business development at an early stage. This contribution presents the latest results on the ecological assessment of the revolPET process as well as various scenario analyses.



Figure 1: Realization of a circular economy for PET-containing plastics through the use of revolPET technology, which enables the recovery of the monomers terephthalic acid (PTA) and ethylene glycol (MEG) from PET in primary quality.

¹ Eunomia, 2022, How circular is PET https://zerowasteurope.eu/wp-content/uploads/2022/02/HICIP_V13-1.pdf

² McKinsey, 2022, Scaling textile recycling in Europe, <https://www.mckinsey.com/industries/retail/our-insights/scaling-textile-recycling-in-europe-turning-waste-into-value>

³ DECHEMA und Future Camp, 2019, Roadmap Chemie 2050, <https://www.vci.de/vci/downloads-vci/publikation/2019-10-09-studie-roadmap-chemie-2050-treibhausgasneutralitaet.pdf>