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Plastics in the **Environment**

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Recycling PET packaging

Innovative PET recycling of multilayer composites

Food packaging is often made up of several layers of different plastics. These multilayer plastics make the recycling process much more difficult, resulting in most of the materials ending up in the incinerator.

Photo: © Josep Curto/Shutterstock

„The revolPET® technology selectively and continuously depolymerizes plastic waste containing PET, opening up new fractions for a circular economy."

Carsten Eichert, RITTEC Umwelttechnik GmbH

Polyethylene terephthalate (PET) has many uses in food packaging. In addition to bottled drinks, PET can be found in packaging trays used for cheese, salads, fruit, meat or fish. A single package is composed of different types of plastic. Up until now, it has not been possible to recycle these mixed plastics. However, innovative revolPET® technology can now be employed for selective depolymerization of the PET content.

Multilayer packaging – a double-edged sword

Plastic packaging ensures a long shelf life for foodstuffs. In order to ensure that the specific packaging requirements for each food are met, multilayer films with specific protective functions are utilized.

In this process, different plastics are fused together to the extent that separation of individual layers is nearly impossible. As a result, these types of packaging are nearly always sorted out for thermal recycling, i.e. incineration.

Packaging trays generally have a PET content of over 80 %, as well as one or more polyolefin layers. The different types of plastic cannot be processed together to form a new material, rendering them useless.

revolPET® utilizes selective depolymerization to regain raw tmaterials from multilayer composite

Continuous depolymerization in the revolPET® process breaks down over 97 % of PET into basic monomers. These building blocks allow for the production of new PET, which has the same quality as virgin material.

The revolPET® technology does not damage other types of plastic, leaving them intact for possible recycling and other recovery options.

The currently customary treatment of multilayer composite packaging from the collection of the dual systems results in low-grade mixed plastics with a high proportion of PET.

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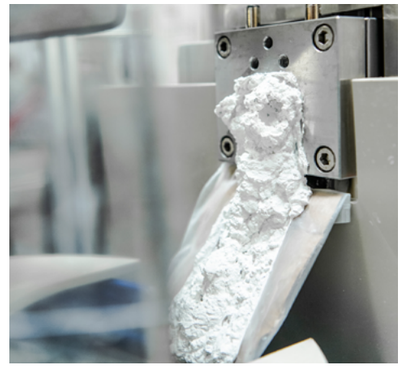
Research on disruptive recycling technology for PET waste plastics

The revolPET® technology was developed to facilitate continuous, selective depolymerization of PET composites as part of the project „Development of a Recycling Technology for PET Waste Plastics from Multilayer Material and Other Waste Composites (revolPET)". The technology enables recycling of colored or multilayer packaging and production of high-quality monomers. Various PET products can be remanufactured from these basic materials. The patented revolPET® technology recovers raw materials from previously non-recyclable waste and creates a new stream of recyclable materials.

revolPET® technology is economically viable and ecologically beneficial

The revolPET® technology is highly efficient and meets the prerequisites for economic viability. Low process temperatures, integrated circuits and the absence of reaction additives minimize costs and CO_2 emissions. The high quality of the monomers enables yields comparable to virgin material. Moreover, the technology saves more than 60 % of CO_2 in comparison to new production of PET from crude oil.

The revolPET® technology is used to obtain high-quality monomers from composite plastic waste that contains PET. Shown here: 1) depolymerized PET being discharged from the reactor and 2) recovered terephthalic acid, one of the two monomers used in the production of PET.



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Separated, undissolved impurities from mixed or multilayer plastics. Shown here: PE flakes from PET/PE composite.

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Status
March 2021

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This fact sheet was prepared as part of the research focus „Plasticsin the Environment" (duration 2017-2022), funded by the German Federal Ministry of Education and Research (BMBF). The authors are solely responsible for the contents of the fact sheet. They do not reflect the official opinion of the BMBF.

Eichert, Carsten; Biermann, Lars; Salikov, Vitalij; Brepohl, Esther; Müller, Clemens; Paschetag, Mandy; Scholl, Stephan (2021): Recycling PET packaging: Innovative PET recycling of multilayer composites. Fact sheet 6 of the BMBF research focus „Plastics in the Environment".

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