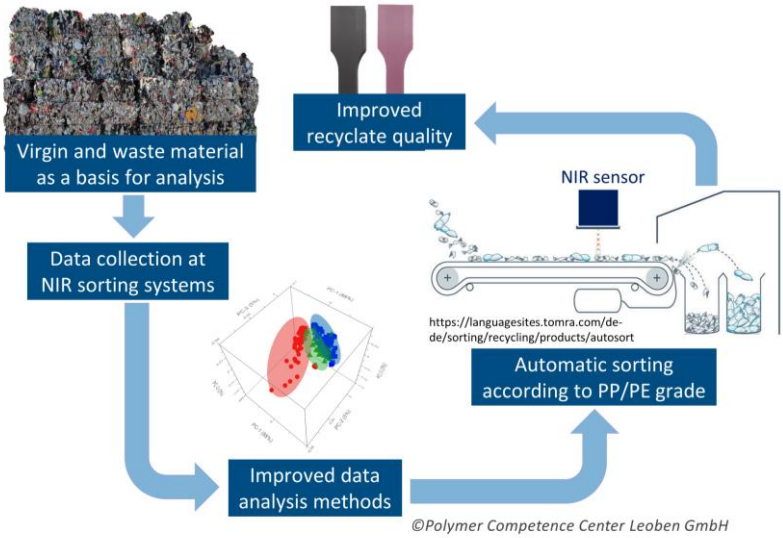
SUCCESS STORY

PCCL-K1
K1-Center in Polymer Engineering and Science

Programme: COMET – Competence Centers for Excellent Technologies

Programme line: COMET-Centre

Type of project: MechRecycling, 2021-2024, multi-firm



INCREASE IN RECYCLATE QUALITY THROUGH IMPROVED SORTING SYSTEMS

IMPROVED SORTING SYSTEMS ALLOW HIGHER-QUALITY POLYMER RECYCLATES THAT CAN BE USED IN A WIDER RANGE OF APPLICATIONS AND IN LARGER QUANTITIES.

Plastics recyclates still exhibit inferior qualities compared to virgin materials. This makes them unsuitable for certain applications and processing methods. Recyclates are therefore currently often used only in less demanding applications or only in small quantities. In addition to negative influences such as contaminations with foreign materials or other polymers, also the mixture of different types of the same polymer has negative effects on the properties of the recyclate. Different types differ in their molecular structure, morphology and content of additives. These differences also lead to differences in their properties as well as their processing behaviour. As a result, different types are more or less suitable for different processing methods and applications. In order to attain increased recyclate quality, it is necessary to separate the different types of the same polymer prior to recyclate production.

Impact and effects

By increasing the recyclate quality, the range of applications can be extended, and recyclates can be used in larger quantities. On the one hand, this leads to a saving of virgin materials, which contributes to the conservation of resources. On the other hand, this promotes recycling in general, leading to higher recycling rates and thus waste reduction.

Federal Ministry
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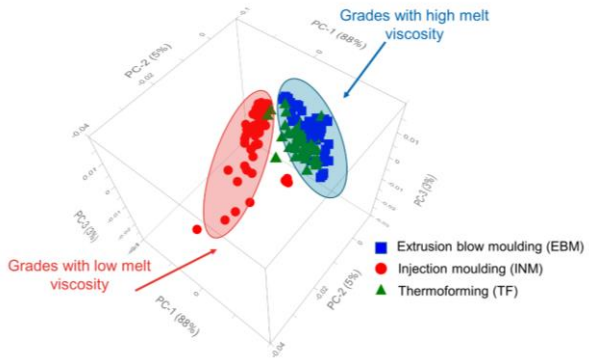
The COMET-project "MechRecycling - Improving the quality of recycled polymer waste" aims at increasing the recycle quality of the two most commonly used plastics, polyethylene (PE) and polypropylene (PP), by improving mechanical recycling processes. Special attention is paid to the improvement of conventional near infrared (NIR) sorting systems by new or improved data analysis methods. The aim is to sort PE and PP according to their different types or according to processing methods. Through a proof of concept in which recycles were produced from an unsorted and a hand-sorted PP stream, where the samples were sorted by their processing method, the increase in recycle quality via sorting by processing methods was demonstrated. Using data from various PE and PP samples recorded at NIR sorting lines in combination with improved data analysis methods, promising results have already been obtained. The possibility of sorting PE by density and PP by processing method or type was shown. The next step is to implement and test the created data analysis models in an industrial sorting plant. The feasibility and sorting quality are evaluated on an industrial scale by means of sorting trials.



©PCCL: Separation of PP samples according to different processing methods using Multivariate Data Analysis.

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- Budapest University of Technology and Economics, HU
- Poloplast GmbH & Co KG, AT
- PreZero Polymers Austria GmbH, AT
- Redwave – a division of BT-Wolfgang Binder GmbH, AT

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