

Newcycling® – An Innovative Approach for High Quality Plastics Recycling

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Abstract

In Municipal Solid Wastes (MSW), the recycling of plastics is one of the most challenging tasks. Every year 78 million tons of plastics are used for packaging and need, therefore, to be treated afterwards. About 20 % of this amount consists of monolayer or multilayer films. As polymers have a decomposition duration of some 100 years, simple disposing is no sustainable option. To prolong the current life cycle of plastic products is desirable and the way forward.

For plastics recycling, different options are possible which all require pre-treatment process steps such as sorting and cleaning.

The conventional mechanical recycling is converting the feed directly by extruding or compounding the cleaned plastic waste. Therefore, this approach is not able to separate multilayer films which may consist of different polymers. Consequently, the product is a mixture of different polymers with varying material properties which can only be used in applications which tolerate product impurities. Due to these reasons, this approach is also known as “downcycling”.

During chemical recycling, the polymer chains are broken down to their monomers e.g. by pyrolysis with a relatively high energy input. Afterwards, the polymers are built up again from said monomers. The product can be called virgin material and fulfills the expected properties.

The solvent-based recycling is somewhere between the beforementioned processes: based on the selective dissolving of polymers, virgin-like products can be generated after separation. Additionally, re-additivation is possible e.g. during extrusion in order to achieve the desired properties that were lost during the polymers' previous life cycle.

The APK AG operates an 8.000 kt/a pilot plant with the solvent-based Newcycling® process in Merseburg, Germany. It is the company's goal to continuously improve the process, for example to widen the processable feedstock.

Biography:

Hannes Mann received his Master degree as well as his PhD in process engineering at the Otto-von-Guericke-University in Magdeburg, Germany. He started his professional career at Radici Chimica Deutschland GmbH in Elsteraue, Germany, as Technologist and is now working for the APK AG in Merseburg, Germany, as Process Engineer Core Technology. Next to being responsible for the Process Development for Conceptual Plant Designs, Dr.-Ing. Mann is also the Technical Advisor for Process Engineering for the Pilot Plant in Merseburg.

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