

Advanced Recycling - from a Technology Provider Perspective

During last 20-30 years plastics recycling was characterized by classic mechanical recycling consisting of pre-treatment, melting and granulation. Especially post-consumer recycling leads to a reduction in quality, which means that original applications can hardly be realized any more. The packaging sector in the food industry in particular places high demands on the recyclate, which means that only a few polymers find their way back to their original application. PET is one of the few polymers that can be recovered to food grade quality. In the case of polyolefins, chemical recycling offers a feasible route by monomers or synthetic crude oils returning to the petrochemical industry to generate practically virgin plastics.

Plant engineering in the field of plastics recycling is dominated by mechanical recycling. Specific washing and shredding systems followed by specific extrusion and granulating units (e.g. cutter-compactor etc.) with high-performance degassing and special melt filters are now standard systems and thousands of them are in use worldwide.

In the field of PET recycling, the use of high-performance vacuum has also made it possible to decontaminate and "cure" the polycondensates. The recyclate is now almost Virgin quality again, which means that a milestone has been reached in the area of food grade recycling through this chemo-physical process.

In terms of the circular economy and the need for very high-quality recyclates, chemical recycling processes are the focus of current developments. The technical challenges are visibly shifting from classical plastics technology to chemical process engineering. This also results in a changing image of the technology providers, which used to be characterized by mechanical processing and plastics expertise, but now chemical plant manufacturers and new players appear and gaining their importance. The picture of potential customers is also changing; in addition to the classic plastic recycling companies, waste disposal companies, converters and even petrochemical industry are now being added. Last but not least, "design for recycling" has not yet reached the level needed to reduce the enormous variety of plastics and plastic composites.

Plastic recycling is developing rapidly and broadly. Consolidation processes can be observed among recyclers as well as among technology providers. It remains to be seen whether sticking to traditional technologies, specialization or full-liner capability will make the difference. One thing remains certain, the challenges of advanced recycling are great.