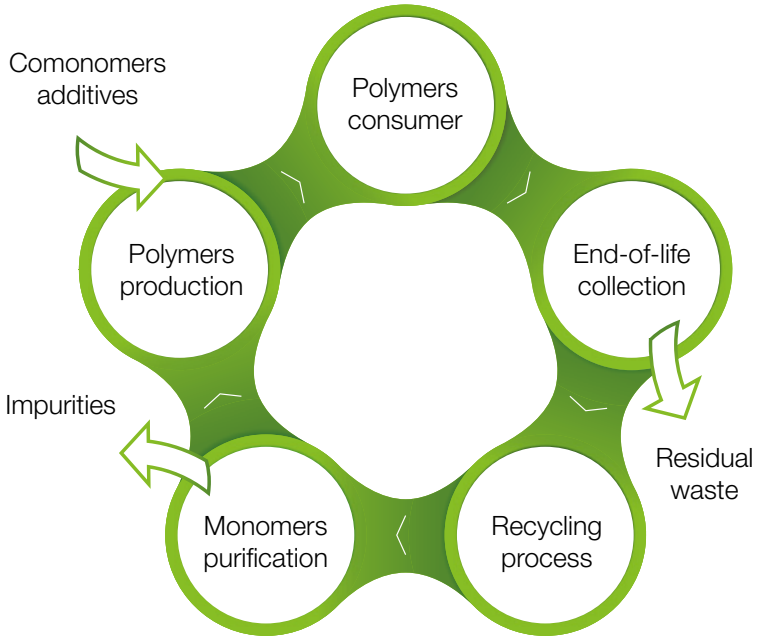
SULZER

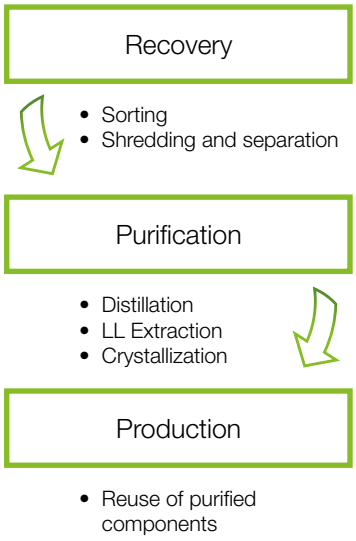
Melt crystallization technology

Caprolactam purification from **reclaimed polyamide**

Recycling loop

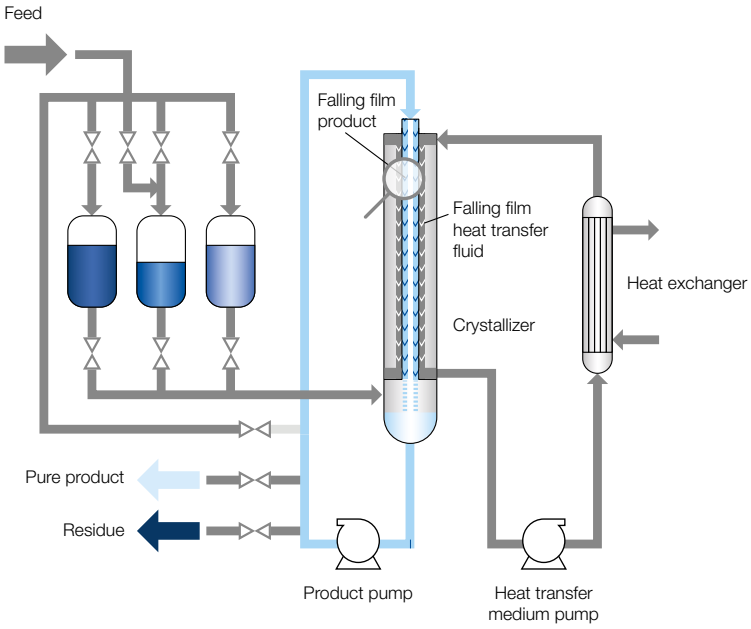
Thousands of tons of waste are burned or disposed every year. Therefore, the development of recycling methods that allow the recovery of components that can be used is key. Indeed all kinds of impurities accumulate during the plastic goods lifetime and fractional melt crystallization is the decisive process step to recover a truly virgin monomer. This is the most suitable technology to tackle this challenge.





Falling film crystallization

Falling film crystallization is characterized by three phases of operation: filling of molten feed and crystal layer formation; partial melting of the crystal layer and the final melting phase. The crystallizer is the key component to remove critical impurities.



Reclaimed polyamide and caprolactam purification

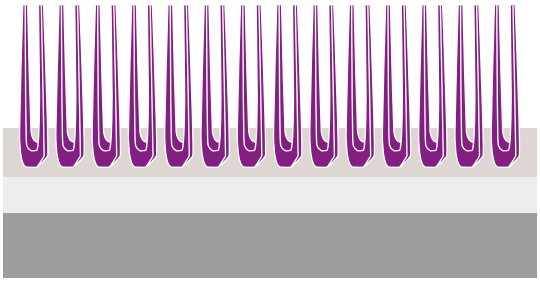
Case study floor carpeting recycling

Face fibre

primary backing

Precoating of chalk

Backing (foam)



The face fibre of about

60%

of all used floor carpeting consists of the polyamides Perlon and Nylon.

Recovery and purification

Caprolactam

The caprolactam water mixture is subjected to purification stages: Distillation and falling film crystallization

Polyamide 6 recovered

The floor carpeting will be sorted according to its face fibre. The Nylon and Perlon will be separated mechanically into their various constituents. The polyamide 6 recovered is depolymerized to caprolactam.

Polyamide 6

The high-purity caprolactam can be then polymerized again to polyamide 6, which can be reused in the manufacture of the floor carpeting.

Take away

This recycling operation is more energy efficient than the traditional carpet manufacture where the caprolactam production comes from crude oil (fossil); there is no use of solvents and sulfur components to be disposed of.

Sulzer layer crystallization is one of the decisive processing steps in this recycling operation.

1. It is a proven technology with very low risk.
2. Increased quality and recovery yield without compromise.
3. Operation friendly.
4. No maintenance.

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Chemtech is also leading the way in ecological solutions such as biopolymers as well as textile and plastic recycling, contributing to a circular economy. Our product offering ranges from technology licensing to process components all the way to complete separation process plants. Customer support ranges from engineering and field services to tray and packing installation, tower maintenance, welding and plant turnaround projects – ensuring minimal downtime.