



1 Recycled granules.

RECYCLING PLASTICS

Fraunhofer Institute for Process Engineering and Packaging IVV

Giggenhauser Strasse 35
85354 Freising

Contact

Dr Andreas Mäurer
Phone +49 8161 491-330
andreas.maeurer@ivv.fraunhofer.de

www.ivv.fraunhofer.de

Our goal

The increasing cost of energy and crude oil is enhancing the attractiveness of polymer recyclates due to the fact that these can be manufactured at lower cost and with lower energy consumption than virgin polymers. At present, however, only the recycling of type-pure plastic waste is an established industrial process. Although numerous sorting and treatment processes exist for mixed post-consumer plastic waste, these processes produce insufficiently pure products and do not efficiently remove contaminants and hazardous materials. For this reason, the products often do not meet required industrial specifications and the use of these recyclates is hence limited to a small number of applications where quality is of lesser importance.

Our process development work aims to produce high-quality recyclates from complex waste mixtures which can then be used to manufacture high-quality products.

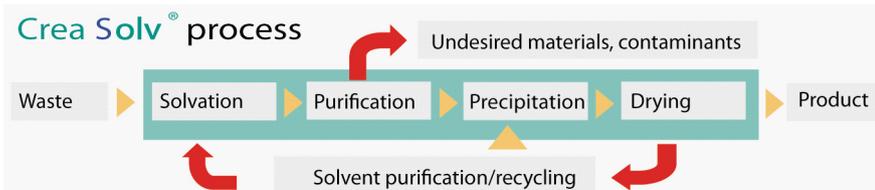
Our development work

CreaSolv® process

A feature of our patented CreaSolv® process is the high value creation. Target polymers are selectively dissolved from the plastic waste and contaminants and hazardous materials are effectively removed from the solution using special purification methods. In collaboration with CreaCycle GmbH (Grevenbroich), a specialized producer of non-hazardous and non-VOC solvent systems, customized formulations have been developed for a wide range of wastes and target polymers. The used solvent formulations remain in the process cycle and the purified polymer recyclates have properties akin to virgin polymers. A special feature of the process is the option of separating additives such as brominated fire retardants and plasticizers from the polymer recyclate. Due to new legislation, such additives would limit the use of recyclate in products.



1



CreaSolv® is a registered trade name of CreaCycle GmbH, Grevenbroich

The CreaSolv® process is suitable for recovering thermoplastics (ABS, PS, EPS, PA, PC, PLA, PVC, PET, PE, PP, and blends of these polymers) from complex post-consumer waste streams (WEEE, ELV, construction waste) and mixtures of plastics (packaging waste).

FiltraSolv

In contrast to the CreaSolv® process, the waste plastic is treated with a small amount of solvent only in the FiltraSolv process and, due to the lower viscosity, the mixture is then effectively melt filtered. This process is particularly suitable for type-pure polymer composites (e. g. galvanized plastics).

Separation of composites

The value of polymer composites with metals, ceramics, and other high-value materials (silicon carbide, carbon fibers) is often concentrated in the non-polymer fraction. The recovery of these materials is often problematic due to the polymer matrix. However, an approach using a simplified CreaSolv® process offers promise here: The high-value materials can be efficiently released from the polymer matrix and the polymers are processed into high-quality secondary raw materials.

Our range of services

Sample production and market value determination

In order to assess the quality of materials that can be produced using our processes we carry out feasibility studies and sample production. The products are subjected to material tests and physical-chemical analyses to determine their market value. This value is then compared to the process cost.

Material tests

- MFI
- Tensile and bending tests
- Impact strength (Charpy)

Physical-chemical analysis

- DSC (polymer purity)
- FTIR (polymer characterization)
- X-ray fluorescence (XRF)
- Residual solvent (HS-GC)
- Residual additives (GC-MS, HPLC-MS)

Assistance with your development work

We can also assist your development work with our know-how and test facilities. We are able to assess the effectiveness of your sorting and treatment processes and the purity of your polymer recyclates.

Example applications

The work of the Fraunhofer Institute for Process Engineering and Packaging IVV involves the efficient recycling and reuse of the following materials:

Complex post-consumer waste

- Plastics from electrical and electronic waste (ABS, PC, PS)
- EPS from fish boxes and heat insulation composites
- ABS and polyolefins from end-of-life vehicles (ELVs)
- PLA from post-consumer packaging

Separation of composites

- Composite packaging (e. g. PA/PE)
- Abrasive brushes (PA and SiC)
- Galvanized plastics