

Recycling of Plastics from Cars and Electronic Equipment

Publieke samenvatting / Public summary

Aanleiding

In Electronic Equipment as well as in Automotive Vehicles a lot of different types of plastics are being used. The recent revisions in the EU End-of-Life Vehicle Directive (ELV) as well as the WEEE Directive point out the needs for reuse or recycling of the various materials in cars and electronic waste. For cars the recycling of plastics has not matured yet and is with a percentage of 15% much lower than the 90-95% recycling rate of metals (from Afvalplan Autowrakken 2025). In the Dutch Circulaire Materialen Plan, only 5% of the shredder fraction from cars is allowed for incineration. With the current way of working in recycling this cannot be achieved. Sorting, focusing on identification of black plastic, is needed to get better sorted streams. Dissolution of (brominated) flame-retardants, fillers and additives is needed to improve the recycled quality towards mechanical recycling.

Doelstelling

The goal of this project is to improve the quality and the quantity of the recycled plastics stream coming from WEEE and Automotive by working out circular material value chains for different type of plastics from these value chains at pilot scale. Within this project, the whole value chain is present. This includes the collection, sorting/separation, quality analysis and assessment of substances of very high concern (SVHC's), pretreatment/dissolution, extrusion/compounding, mixing with virgin material and production of parts. These parts will be

Projectinformatie / Project information

Projectnummer / Project number
CPNL252014

Subsidiebedrag / Grant amount
€ 1.683.718,00

Algemene informatie / General information

Penvoerder / Secretariat
Stichting Ispt

Volg Topsector Energie op X / Follow Topsector Energie on X

@TSEnergie

analysed on stability by aging measurements. This step-by-step approach will deliver the information to make techno-economic assessments for commercial operations. Next to that, a predictive model will be developed. The goal of this model is to establish the relationship between polymer-types within the WEEE/Automotive plastic. Particular focus is on degradation[6] and reprocessing of recycle performance over multiple lifecycles in various applications. Within the model, appropriate uncertainty quantifications will be applied.

Korte omschrijving

First the development of identification tools for WEEE/ELV plastics, with a focus on heterogeneous black plastics, will be executed at lab scale (THz Raman, DUV Raman) and tested at pilot scale (both MIR and THz RAMAN + DUV Raman) and focused on the selected material streams. In the next step the sorted materials will be purified using the in the project developed material specific dissolution technologies. The purified plastics will be analysed, based on which a material specific compounding strategy, involving stabilizers and compatibilizers as well as virgin polymer will deliver a plastic with a specific recycled content. The compounded plastics will be molded and the molded parts will be tested based on the application specification, including stability analysis. A predictive model will be developed which assesses the quality of the feedstock to be used and the most effective recycling procedure to be applied based on the quality of a shredded/sorted plastic stream from WEEE or Automotive waste in order to get a recycled material for a specific application. A techno-economic assessment for the selected materials for both the WEEE and Automotive value chain will be made

Resultaat

The project will result in: 1. An overview of the availability of feedstock for recycled plastics, based on the selection of different plastics the project will focus on; 2. New technologies for better sorting and identification of black plastics as well as the presence of the selected SVHC; 3. The reduction of

the selected SVHC, in the various selected plastics, based on targeted dissolution techniques and during compounding; 4. A validated model which assesses the quality of the feedstock to be used and the most effective recycling procedure to be applied based on the quality of a disassembled/sorted plastic stream from WEEE or Automotive waste in order to get a recycled material for a specific application. This includes: - compounding needs (incl. compatibilization/modification) - stability analysis (i.e. aging) 5. A techno-economic assessment per circular material value chain.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

Voor meer informatie over de Topsector Energie, ga naar www.topsectorenergie.nl.

Voor meer informatie over de TSE / Energie-Innovatie regelingen die RVO aanbiedt, ga naar www.rvo.nl/tse.