IMPRES (Integrated Method for Polycarbonate Recovery from Electronics Scrap)

Publieke samenvatting / Public summary

Aanleiding

The use of plastics contributes significantly to global CO2 emissions because of emissions associated with the use of oil as feedstock, the production of plastic ánd the fact that most plastics are incinerated after use. Hence recycling of plastics will contribute to lowering CO2 emissions. Waste Electrical and Electronic Equipment (WEEE) is the fastest growing stream of municipal solid waste as the number of electronic goods continues to increase every year as well as the decreasing life span. Plastics make up approximately 30% of WEEE. Sorting of WEEE plastics results in a large residual fraction of approximately 40% with major constituents polycarbonate (PC) and PC/ABS blends. Moreover, recovery of PC is targeted because of their specific material properties (transparent, shockresistant) that makes them interesting for re-use. Unfortunately, large scale re-use of PC plastics from waste electronics is currently not possible because of the presence of additives like flame retardants that obstruct re-use. A technically feasible sorting and recovery process is needed that is both economically viable and sustainable.

Doelstelling

The overall aim of IMPRES is to pave the way for large scale re-use of polycarbonate plastics from waste electronics in a technically feasible, economically viable and sustainable manner, thus reducing the CO2 footprint of this industry. Objectives of the project are: 1. Design of optimised system for recovery of polycarbonate polymers from

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Publicaties en materialen / Publications and attachments

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WEEE plastics based on combination of sorting and solvo-chemical recycling technology. 2. Evaluating recovered polycarbonate plastics for re-use in high value applications. 3. Assessing the economic and sustainability impact of the developed system. IMPRES aims to recycle 10 kton of PC in the Netherlands which replaces 9 kton of virgin PC and represents a saving of 0.5 PJ/y, equivalent to a reduction of CO2 emissions of 40 kton/year over the life cycle. IMPRES therefore fits well within the TKI Energy & Industry program line 'Circulaire grondstoffen, processen en producten'.

Korte omschrijving

The project starts with the definition by SABIC of requirements for recovered polycarbonates for re-use in different application fields. ICT waste is used as a model stream. Detection and sorting techniques in the sorting line at COOLREC are rearranged to obtain a stream that could comply, after solvo-chemical treatment to remove additives by TNO, with the requirements set. In the first phase, the extent of sorting by COOLREC and solvo-chemical treatment by TNO are optimized to each other to obtain high quality output material. In addition, TNO will perform a quick scan type CO2 reduction calculations to give an estimate on the sustainability of the sorting-separation system. This outcome is used in optimising the system as well. Then, a kg scale sample will be produced, which is evaluated more extensively by SABIC. TNO will perform the sustainability assessment, comparing the system developed to alternative recycling technologies, to conclude the final impact achieved by this project. Finally, SABIC makes a plan for further exploitation of the results obtained in IMPRES.

Resultaat

The following main deliverables will be generated in IMPRES: - Definition of quality parameters for recovered polymer matching requirements for use in different application fields. - Adapted sorting process to produce monostreams of PC and PC/ABS. - Development of a solvo-chemical process for removal of additives from PC polymers from WEEE

plastics, resulting in production of a test sample at kg-scale. - Optimisation of sorting and solvo-chemical process combination to produce the highest product quality relative to the sustainability impact and costs. - Chemical analysis and measurement of mechanical properties of PC polymer obtained from solvochemical processing of sorted e-waste plastic streams. - Comparative sustainability assessment of chemical recycling of sorted polycarbonate WEEE plastic; - Overview of limitations and opportunities for the PC recovery system from e-waste.

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