Chemical (pyrolytic) and mechanical recycling of plastics and composites

Fact Sheet

Project Information

CYCLEPLAST

Grant agreement ID: IC15960717

Project closed

Start date
1 February 1997

End date
31 January 2000

Funded under
Specific research, technological development and demonstration programme in the field of cooperation with third countries and international organizations, 1994-1998

Total cost
No data

EU contribution
€ 249 800,00

Coordinated by
VRIJE UNIVERSITEIT BRUSSEL
Belgium

Objective

Foreseen Results

A technical and economic evaluation of available pyrolytic processes;
Development of a selective multi-stage pyrolysis process, compatible with current industrial developments

Mathematical modelling and upscaling to industrial conditions
Model calculation of the thermal decomposition processes of plastics in various pyrolyser units
Optimization of working conditions (temperature, pressure, catalysts)
Quality control of pyrolysis and mechanical recycling products
Development of a pilot plant
Three EU and two CCE countries start a collaboration to evaluate, test and further develop the practical knowledge on the pyrolysis of post-consumer plastic waste, including plastic and plastic/metal composite waste.
In this proposal chemical (pyrolytic) and mechanical (compatibilizing) methods are tested for recycling plastics, especially mixtures and composites that cannot be reprocessed by simpler methods. The project is structured according to a number of tasks, each of which is tackled by a partner with previous experience in the field and aided by the entire team.

Task 1 is basically a logistic, technical and economic evaluation of plastics recycling by pyrolytic methods.
Task 2.1 is devoted to the effect on pyrolysis of providing mixed rather than individual plastic types, such as accelerated decomposition of PA 6 as a consequence of HCI-evolution from PVC. A major aim is the development and assessment of a process, in which a plastic mixture is decomposed sequentially, either as it is, or after addition of a catalytic substance.
Task 2.2 systematically screens additives for their potential effect on rate and product composition, as well as on the generation of undesirable substances.
Task 2.3 studies carbon formation from single and mixed plastics, its enhancement by specific additives, e.g. carbon black or metal residues, or coke formed in the pyrolysis process proper.
Task 2.4 considers the effect of ageing, which may lead int. al. to the presence of peroxides and affecting viscosity, cross-linking and the decomposition process and products at large.
Task 2.5 looks at the decomposition of PET and possibly other materials that have a potential of creating problems during the operation of a pyrolytic industrial unit.
Task 2.6 addresses the fate of heteroatoms during pyrolysis, in particular the possible ways to eliminate chlorine (and bromine) from the system.
Task 2.7 is relatively undefined as yet, for it covers the treatment of selected metal/plastic composites, depending on demands from industrial partners from EU and CCE.
Task 2.8 is basically mechanical recycling, studied on the basis of binary mixtures separable from mixed plastics by simple means.
Task 3 is the modelling and optimization of idealized industrial reactor types and the testing of the quality of pyrolytic products and compatibilized polymer blends.
Task 4 prepares the transition of the pre-industrial research contained in this project to industrial practice.

Fields of science (EuroSciVoc)

engineering and technology > environmental engineering > waste management > waste treatment processes > **recycling**

engineering and technology > materials engineering > **composites**

natural sciences > chemical sciences > inorganic chemistry > **halogens**

natural sciences > chemical sciences > **catalysis**

natural sciences > mathematics > applied mathematics > **mathematical model**

Programme(s)

FP4-INCO - Specific research, technological development and demonstration programme in the field of cooperation with third countries and international organizations, 1994-1998

Topic(s)

01020702 - Recycling

Call for proposal

Data not available

Funding Scheme

CSC - Cost-sharing contracts

Coordinator

VRIJE UNIVERSITEIT BRUSSEL

EU contribution

No data

Total cost

No data

Address

2,Pleinlaan 2
1050 BRUXELLES
Belgium

Participants (3)

Institute of Macromolecular Chemistry- Academy of Sciences of the Czech Republic

Czechia

EU contribution

No data

Address

2,Heyrovsky Sq.
162 06 Praha

Total cost

No data

UNIVERSITAET KARLSRUHE (TECHNISCHE HOCHSCHULE)

Germany

EU contribution

No data

Address

12,Kaiserstrasse 12
76128 KARLSRUHE

Total cost

No data

Université de Saint-Étienne (Université Jean Monnet)

France

EU contribution

No data

Address

42023 Saint-Étienne

Total cost

No data

Last update: 20 February 1997

Permalink: https://cordis.europa.eu/project/id/IC15960717