Patent alert May 2025

Plastic recycling: from methods to products with recycled content

This month's selection in brief

This month's selection deals with plastic recycling starting with examples of recycling methods followed by example products incorporating recycled plastic. Including (thermo-mechanically) recycled content into manufacturing processes of new products without compromising the mechanical properties of the resulting products is a major challenge. This challenge was overcome in the selected applications where the processing conditions were optimized for the targeted recyclate-containing product.

Our selection:

Container closure

Patent number: EP3740433 B1

Publication date: 2024-05-01

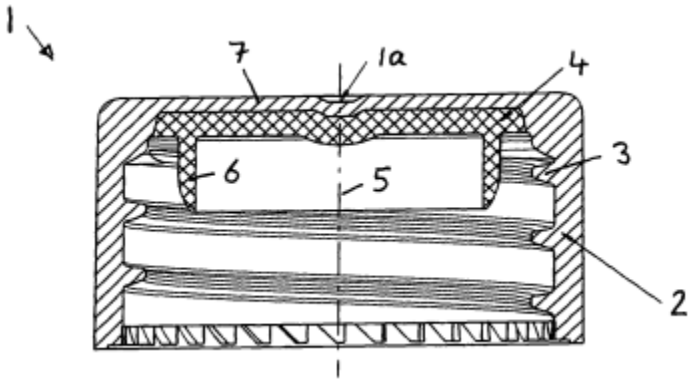
Applicant(s): Georg Menshen GmbH & Co. KG

Inventor(s): RÖMER FRANK; WOMMELSDORF JAN; BEER MARC; KÖLSCHE VOLKER

Summary

It is known to produce container closures of the type mentioned at the outset from non-recycled polypropylene or polyethylene by injection molding. It could be envisaged to use recycled plastic instead of non-recycled plastic. Since recycled plastic varies greatly in its quality and may contain unknown constituents which may pass into the container content, recycled materials have not generally been used to date. In addition, container closures made of a recycled plastic material would not ensure reliable sealing of the closure.

The invention relates to a container closure comprising a dome-shaped closure cap (1) which is made of plastic and can be secured, in particular screwed or plugged, onto the spout of the container; the closure parts (2) that do not come into contact with the contents of the container are made of a recycled plastic, while the closure part (4) that come into contact with the contents of the container are made of a non-recycled plastic.



Source image : https://www.menshen.com/portfolio/weldspouts/

Plastic article recycling

Patent number: WO2024/261635 A1

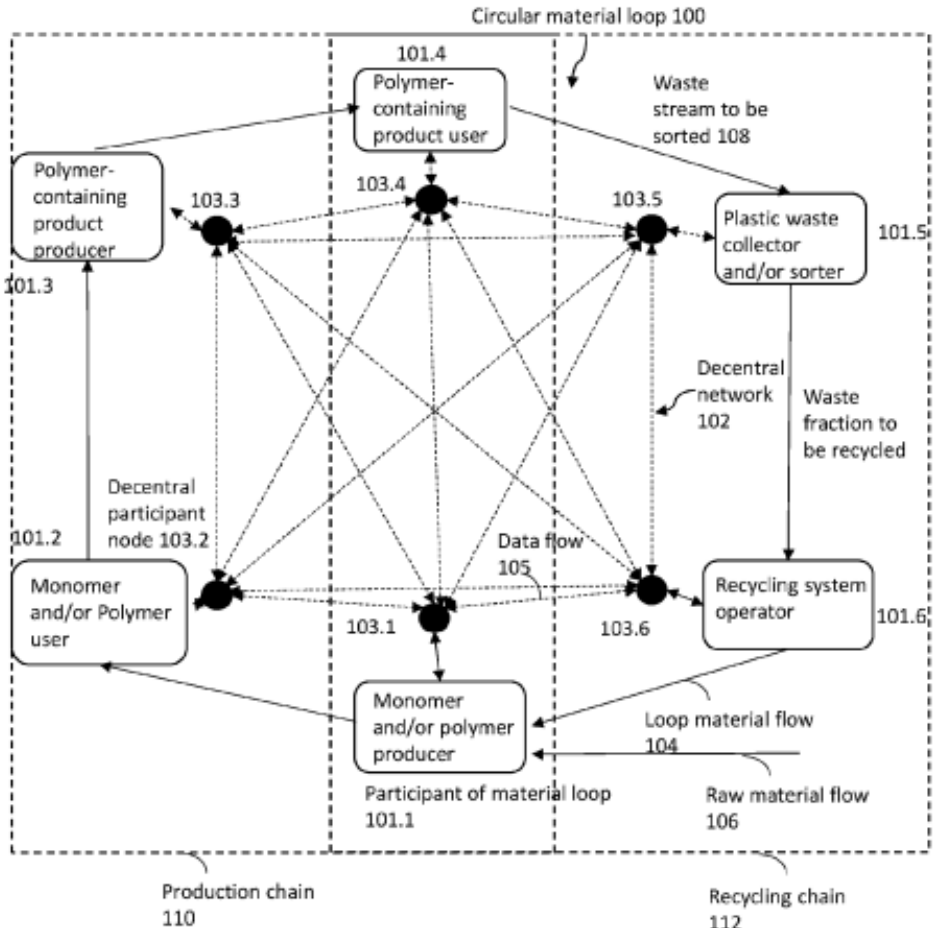
Publication date: 2024-12-26

Applicant(s): BASF

Inventor(s): GRAF NICOLE; GRUMBRECHT BASTIAN; FEYEN MATHIAS; HAAKE MATHIAS; PACK ROBERT; KLOSTERHALFEN STEFFEN THOMAS; MAYER MARION; KREI GEORG ARNOLD; STREGE STEFAN; FREY BODO

Summary

The invention relates to the field of sustainability, in particular to the field of plastic recycling. The disclosure relates to methods, apparatuses, systems, decentral network nodes, plastics articles and computer elements for monitoring substances critical for recycling of a plastic article or component thereof.



Methods of plastic recycling using highly efficient organocatalysts

Patent number: US20240067594 A1

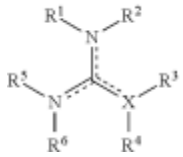
Publication date: 2024-02-29

Applicant(s): UT-Battelle, LLC

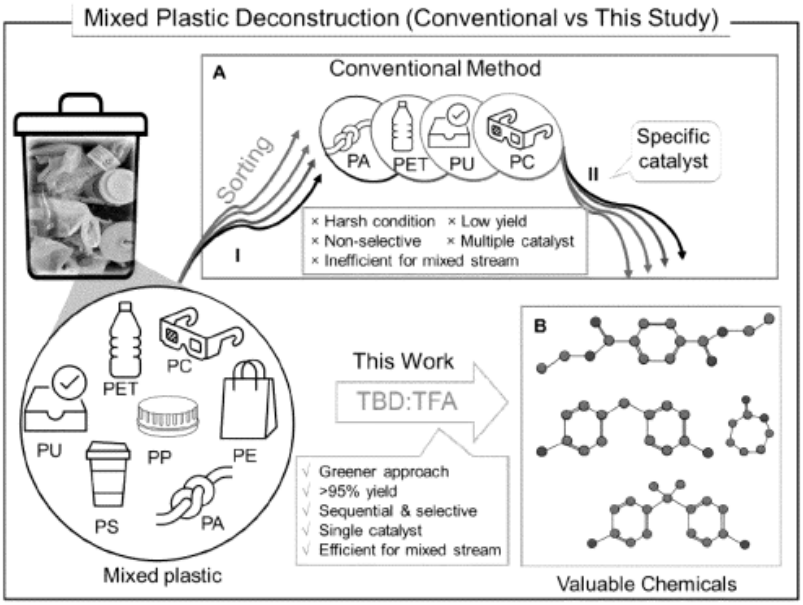
Inventor(s): SAITO TOMONORI; ARIFUZZAMAN MD

Summary

A method of deconstructing polymer waste into at least one useful breakdown product, wherein the polymer waste contains at least one condensation polymer, the method comprising contacting the polymer waste with a catalyst comprising an organic nitrogen-containing base and a carboxylic acid or ester thereof, in the presence of a protic molecule selected from alcohols, diols, polyols, and amines, at an elevated temperature effective for inducing alcoholysis or aminolysis of the condensation polymer, wherein the useful breakdown products comprise monomer species capable of being polymerized, and the organic nitrogen-containing base has the following structure:



wherein: R1, R2, R3, R4, R5, and R6 are independently selected from hydrogen atom, electron pair, and alkyl groups containing one to three carbon atoms, and wherein any adjacent two of R1, R2, R3, R4, R5, and R6 may optionally interconnect to form a five, six, or seven-membered ring.



Recyclate polyethylene composition with improved mechanical and optical properties

Patent number: WO2024/153753 A1

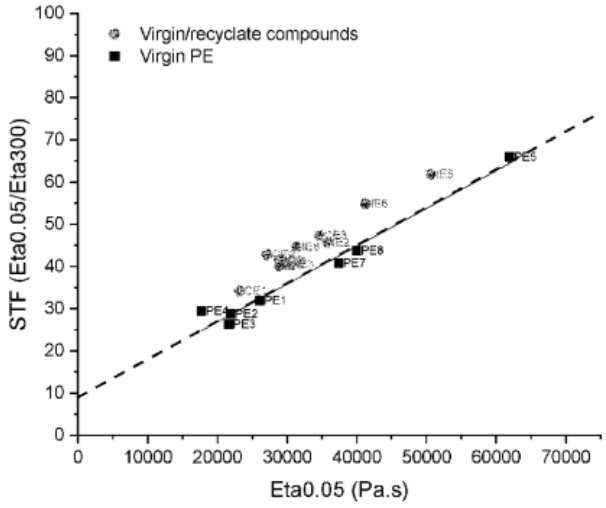
Publication date: 2024-07-25

Applicant(s): BOREALIS AG

Inventor(s): LIU YI; BRAUN HERMANN; RIBARITS ELISABETH

Summary

The present invention relates to a mixed-plastic recyclate polyethylene composition having a melt flow rate (ISO 1133, 2.16 kg, 190 °C) of from 0.1 to 1.5 g/10 min; and a density of from 938 to 985 kg/m3, and comprising 35 wt.-% or more of a recycled polyethylene fraction (rPE), wherein the mixed-plastic recyclate polyethylene composition has (a) a total amount of ethylene units (C2 units) of at least 95.0 wt.-%, as measured by 13C-NMR of the d2-tetrachloroethylene soluble fraction; (b) a total amount of continuous C3 units originating from polypropylene (PP) in an amount of from 0 to 3.0 wt.-%, determined by quantitative 13C{1H} -NMR measurement of the soluble fraction; and (c) an environmental stress crack resistance (ESCR) according to the Bell test, in accordance with IEC 60811-406, method B of at least 1000 h failure time, wherein the mixed-plastic recyclate polyethylene composition further comprises at least one virgin polyethylene component (B), optionally blended with carbon black, and optionally a virgin polyethylene component (B1), different from virgin polyethylene component (B), optionally blended with carbon black, wherein the mixed-plastic recyclate polyethylene composition has a tear resistance, determined according to BS 6469 section 99.1 of at least 24 N/mm. Such a mixed-plastic recyclate polyethylene composition has high purity in terms of polyethylene content, low content of contaminants, high homogeneity, improved mechanical properties, and good optical properties. The present invention further relates to a method for its preparation, to the above recycled polyethylene fraction (rPE), obtainable or obtained by a method of recycling a mixed-plastic recycling stream, to an article made from the above mixed-plastic recyclate polyethylene composition, and to the use of the above mixed-plastic recyclate polyethylene composition for wire and cable applications.



Metallized packaging films made from recycled plastics

Patent number: EP3888911 B1

Publication date: 2022-02-16

Applicant(s): KBG Kunststoff Beteiligungen GmbH

Inventor(s): RIEKER FRANK

Summary

The invention relates to a multilayer plastic film, in particular a multilayer plastic composite film, preferably a multilayer plastic packaging film, based on recycled plastic (recycled plastic), in particular based on recycled plastic originating from waste, having a recycled plastic content of at least 80% by weight, based on the plastic film, and having barrier layer properties (barrier properties) with respect to water vapor and/or gases (preferably oxygen), preferably having barrier layer properties (barrier properties) with respect to water vapor and gases (preferably oxygen), and the use of this multilayer plastic film, in particular as packaging material. The recycled plastic is preferably post-consumer recycled plastic (PCR recycled plastic), in particular recycled PCR films.

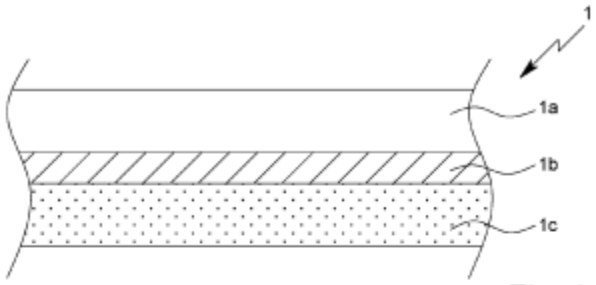


Fig. 1

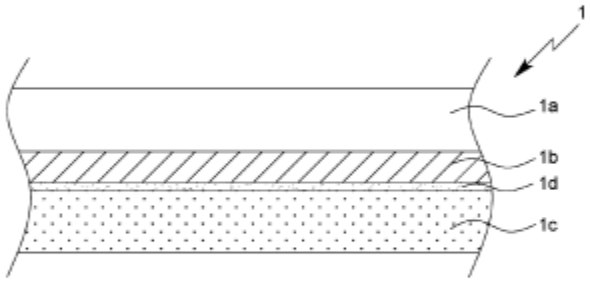


Fig. 2

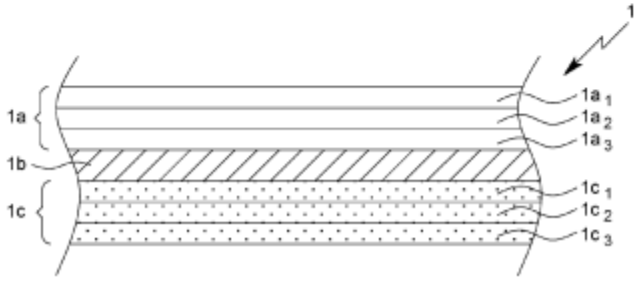


Fig. 3

Sound barriers made from scrap and waste materials

Patent number: US8684135 B2

Publication date: 2014-04-01

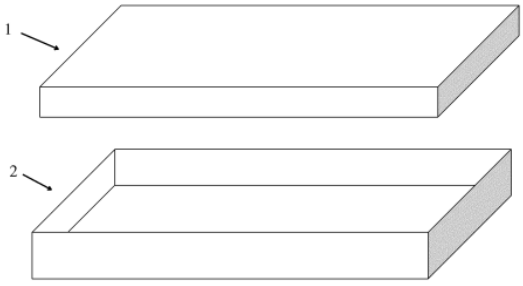
Applicant(s): HERITAGE RESEARCH GROUP

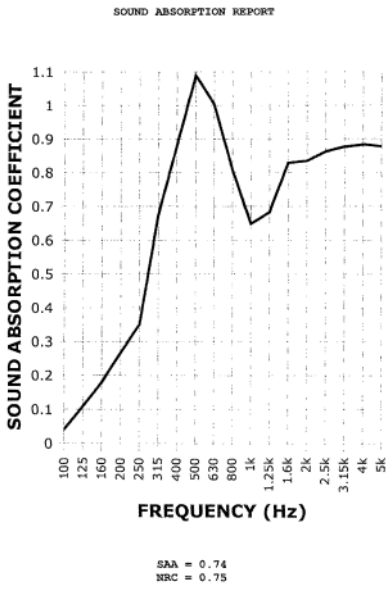
Inventor(s): SMITH GREGORY; KRIECH ANTHONY J; ROBINSON DANIEL; KRIECH MATTHEW

Summary

The present invention relates generally to acoustic structures, and more particularly to sound barrier panels for eliminating or reducing noise emanating from roadways, railways, airports or other noise generating areas. Further the present invention is directed to sound barrier panels that are made from waste materials, including scrap carpet fibers, scrap fiberglass reinforced plastic (FRP) and recyclable plastics.

The sound barrier panels of the present invention are made in part by a mixture carpet fibers, cement, water and optional an air entraining admixture and/or plastic wastes including FRP, recyclable plastics and/or mineral wool fibers or waste slag fibers (which are byproducts of mineral wool manufacturing processes). These components are mixed together to form a sound absorbing material that can be formed, e.g. cast, molded, etc. into a desired shape or coated, laminated or formed onto a supporting structure. When used, the air entraining admixture produces air bubbles in the sound absorbing mixture and can be a conventional air entraining admixture that is used in cement mixtures. The cement used in the present invention can be Portland or various other binding materials including organic or inorganic cements, hydraulic cements, hydraulic limes, porous binders, as well as other adhesives or glues.





Insulating floor material and method for producing such material

Patent number: EP3901393 B1

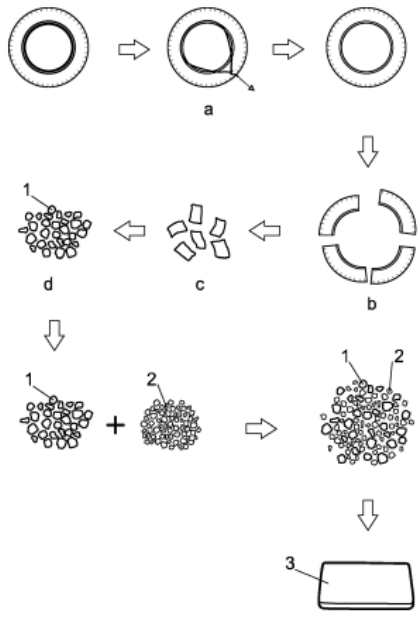
Publication date: 2021-10-27

Applicant(s): AKUFLAT S.R.O, FORRO IMRICH

Inventor(s): FORRO IMRICH

Summary

The insulating floor material includes at least recycled rubber crumb (1) with fraction 2 mm to 20 mm in amount of at least 20% of the mass and the rest is supplied by the crumb (2) from the plastic recyclate with fraction up to 15 mm. It is placed in the closed bag (3), whereby the material of the bag (3) malleably delimits the outer shape of the insulating floor material after its placement onto the insulated floor and the bag (3) thus becomes a permanent part of the floor's construction. The bag (3) allows to maintain the loose character of the mixture inside and the insulating floor material follows the irregularities and wiring and piping on the carrying surface of the floor. In the preferable arrangement the crumb (2) of the plastic recyclate is the waste from the electric cables insulation with fraction from 0,2 mm to 1 mm and/or the crumb (2) of the plastic recyclate is from the waste polypropylene with fraction from 2 mm to 10 mm. In one of the preferable arrangements the crumb (1) is in a share of 20% to 30% of the mass, the waste from the electric cables insulation is in a share of 20% to 30% of the mass, the waste polypropylene is in a share of 45% to 55% of the mass.



Packaging films made of recycled plastics

Patent number: EP3858608 B1

Publication date: 2022-02-16

Applicant(s): KBG Kunststoff Beteiligungen GmbH

Inventor(s): RIEKER FRANK

Summary

The invention relates to a multilayer plastic film, in particular a multilayer plastic composite film, preferably a multilayer plastic packaging film, based on recycled plastic (recycled plastic), in particular based on recycled plastic originating from waste, having a recycled plastic content of at least 80% by weight, based on the plastic film, and the use thereof, in particular as packaging material. The recycled plastic is preferably post-consumer recycled plastic (PCR recycled plastic), in particular recycled PCR films wherein the plastic film (1) comprises a layer composite of at least three film layers (1 a, 1 b, 1 c) connected to one another, in particular connected and/or co-extruded by means of co-extrusion, wherein the plastic film (1) and/or the layer composite comprises a first outer film layer (1 a) and a second outer film layer (1 c) and a carrier film layer (1 b) arranged between the first outer film layer (1 a) and the second outer film layer (1 c), wherein the plastic film (1) has a plastic recyclate content of at least 80% by weight, based on the plastic film (1), wherein the plastic film (1) has at least substantially only a single plastic grade according to DIN EN ISO 11469, wherein the plastic grade is present with a grade purity of at least 90% by weight, wherein the ratio of the layer thicknesses of the first outer film layer (1 a) / carrier film layer (1 b) / second outer film layer (1 c) varies in the range of 10 - 35: 40 - 60: 10 - 35, wherein at least two of the film layers (1 a, 1 b, 1 c) each have different mechanical properties.