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(54) Non-postdrawn polyolefin with high tenacity

(57) The invention relates to non postdrawn fibers with high tenacity, consisting essentially of predominantly isotactic propylene polymers having a crystallisation temperature of > 116°C (DSC) and 0,001 to 2% by weight, based on the propylene polymers used, of polymers different from isotactic propylene polymers and optionally 0,001 to 2% per weight of benzoic acid or C_7-C_{13} benzoic acid derivatives and/or 0,001 to 2% by weight of dibenzylidene sorbitol, derivatives of sorbitol and/or diphenylglycine and/or 0,001 to 2% by weight of salts of C_6-C_{18} aliphatic or C_7-C_{13} aromatic carbonic acids, selected from sodium benzoate, tertiary-butylbenzoic acid aluminia salt and/or long chain C_8-C_{18}-carbonic acid salts; 0,001 to 2% by weight of phosphoric acid derivatives, selected from ammonium polyphosphate, cyclic calcium phosphate compounds, sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl)phosphate and/or bis-(tertiary-butyl) phosphoric acid sodium salt; and/or 0,001 to 2% by weight of talc, the fibers having tenacity values of 2,0 to 5,0 cN/dtex, a process for producing them and their use.

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Description

[0001] The invention relates to non-postdrawn polyolefin fibers with high tenacity from propylene polymers as well as to a process for producing them.

[0002] Fibers from propylene polymers are known (Ullmann's Encyclopedia of Industrial Chemistry, Vol. A10, p. 536-542, Weinheim 1987).

[0003] Known methods for producing high tenacity fibers are oxidative chain scission degradation of hot spun fibers in conjunction with a delayed quench step (U.S. 5 281 378, US 5 318 735), the use of reactor-grade propylene polymers produced by single-site catalysis (EP 0 854 212) for producing the fibers, or the use of blends consisting of mixtures of propylene homopolymers, propylene copolymers and heterophasic propylene polymers being stabilized with organic phosphites, phenolic antioxidants or HALS-compounds for producing the fibers (EP 0 632 147). The disadvantage of these methods is, that non-postdrawn propylene polymer fibers having tenacity values of 2,0 to 5,0 cN/dtex cannot be realised.

[0004] It is the object of the present invention to provide non-postdrawn polyolefin fibers having tenacity values of 2,0 to 5,0 cN/dtex comprising propylene polymers.

[0005] According to the present invention, this object is achieved by Non-postdrawn polyolefin fibers with high tenacity, consisting essentially of predominantly isotactic propylene polymers having a crystallisation temperature of > 116°C (DSC) and 0,001 to 2% by weight, based on the propylene polymers used, of polymers (different from isotactic propylene polymers), selected from the group of tetrafluoroethylene polymers, polycarbonates, polybutyleneterephthalate, polyethyleneterephthalate, 3-methylbutene polymers, 4-methylpentene-1-polymers, syndiotactic propylene polymers, polyphenyleneoxides, propylene-methylbutene copolymers, styrene-acrylonitrile copolymers, polyallyltrimethylsilanes and/or hydrolysed ethylene vinylacetate copolymers and/or mixtures thereof, and optionally 0,001 to 2% per weight of benzoic acid or C_7-C_{13} benzoic acid derivatives and/or 0,001 to 2% by weight of dibenzylidene sorbitol, derivatives of sorbitol and/or diphenylglycine and/or 0,001 to 2% by weight of salts of C_6-C_{18} aliphatic or C_7-C_{13} aromatic carbonic acids, selected from sodium benzoate, tertiary-butylbenzoic acid aluminia salt and/or long chain C_8-C_{18}-carbonic acid salts; 0,001 to 2% by weight of phosphoric acid derivatives, selected from ammonium polyphosphate, cyclic calcium phosphate compounds, sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl)phosphate and/or bis-(tertiary-butyl) phos-phoric acid sodium salt; and/or 0,001 to 2% by weight of talc, the fibers having tenacity values of 2,0 to 5,0 cN/dtex.

[0006] The predominantly isotactic propylene polymers are essentially consisting of

(a) 50 - 100 wt% propylene polymers, preferably propylene homopolymers, produced using Ziegler-Natta catalysts or metallocene catalysts, especially with an Mw/Mn ratio of 2 to 4.5, and/or copolymers of propylene, ethylene and/or α-olefins with 4 to 18 carbon atoms and a propylene content of 80.0 to 99.9% by weight in the form of random copolymers, block copolymers and/or random block copolymers, with melt indexes of 0.5 to 40 g/10 min at 230°C/2.16 kg and preferably of 1 to 5 g/10 min at 230°C/2.16 kg,

(b) 0- 50 wt % of a polyolefin mixture with an Mw/Mn ratio of 2 to 6 and a melt index of 0,5 to 40 g/10 min at 230°C/2.16 kg, essentially consisting of

> (b1) 60 to 98% by weight of a crystalline copolymer of 85 to 95% by weight of propylene and 15 to 0.5% by weight of ethylene and/or an α-olefin of the general formula $CH_2 = CHR$, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,
>
> (b2) 2 to 40% by weight of an elastic copolymer of 20 to 70% by weight of ethylene and 80 to 30% by weight of propylene and/or an α-olefin of the general formula CH_2CHR, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,

(c) 0 - 30 wt% of highly amorphous polypropylenes or propylene copolymers with a crystalline poly-propylene or crystalline propylene copolymer content of less than 10% by weight, an enthalpy of melting of less than 40 J/g and a melt index of 0.5 to 40 g/10 min at 230°C/2.16 kg, the largely amorphous polypropylene being a homopolymer of propylene and/or a copolymer of propylene of at least 80 mole percent propylene and not more than 20 mole percent of one or more α-olefins of the general formula CH_2CHR, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,

(d) 0 - 10 wt% of non-isotactic propylene homopolymers with a melting point of 145° to 165°C, a melt viscosity of 200,000 cps at 190°C and a heat of crystallization of 4 to 10 calories per gram, 35 to 55% by weight being soluble in diethyl ether,

(e) 0 - 30 wt% of modified propylene homopolymers and/or propylene copolymers with melt indexes of 0.5 to 40 g/10 min at 230°C/2.16 kg and preferably of 2 to 5 g/10 min at 230°C/2.16 kg, and a ratio of the intrinsic viscosity of the modified propylene polymer to the intrinsic viscosity of the basic unmodified polymer (component a) with largely the same weight average molecular weight of 0,2 to 0,95.

[0007] The polyolefin mixtures b) of crystalline copolymers and elastic copolymers, optionally contained in the non-postdrawn polyolefin fibers, are polymer mixtures described, for example, in the European patents

0 400 333 or 0 472 946.

[0008] The largely amorphous polypropylenes or propylene copolymers c), optionally contained in the non-postdrawn polyolefin fibers are, in particular, stereo block polypropylenes, which are prepared, for example, by using highly active Ziegler-Natta catalysts fixed on a metal oxide (Collette, J., Macromolecules 22 (1989), 3851 - 3858; German patent 28 30 160) or soluble Ziegler-Natta catalysts (de Candia, F., Makromol. Chem. 189 (1988), 815 - 821), optionally with subsequent reactive modification (European patent 636863) and/or degradation (European patent 640 850).

[0009] Examples for the non-isotactic propylene homopolymers d), optionally contained in the non-postdrawn polyolefin fibers are the products described p.e. in the European patent 0 475 307 or in the European patent 0 475 308.

[0010] The modified propylene polymers e), optionally contained in the non-postdrawn polyolefin fibers, can be produced by any number of processes, e.g. by treatment of the unmodified propylene polymer with thermal decomposing radical-forming agents and/or by treatment with ionizing radiation, where both treatments may optionally be accompanied or followed by a treatment with bi- or multifunctionally unsaturated monomers, e.g. butadiene, isoprene, dimethylbutadiene or divinylbenzene. Further processes may be suitable for the production of the modified propylene polymer, provided that the resulting modified propylene polymer meets the characteristics given above.

[0011] Examples for said modified propylene polymers e) optionally contained in the non-postdrawn polyolefin fibers, are, in particular:

- polypropylenes modified by the reaction of polypropylenes with bismaleimido compounds in the melt (EP-A-0 574 801; EP-A-0 574 804),
- polypropylenes modified by the treatment of polypropylenes with ionizing radiation in the solid phase (EP-A-0 190 889; EP-A-0 634 454),
- polypropylenes modified by the treatment of polypropylenes with peroxides in the solid phase (EP-A-0-384 431) or in the melt (EP-A-0-142724),
- polypropylenes modified by the treatment of polypropylenes with multifunctional, ethylenically unsaturated monomers using ionizing radiation (EP-A-0 678 527)
- polypropylenes modified by the treatment of polypropylenes with multifunctional, ethylenically unsaturated monomers in the presence of peroxides in the melt (EP-A-0 688 817; EP-A-0 450 342)

[0012] These modified polypropylenes have melt indexes of 0.5 to 40 g/10 min at 230°C/2.16 kg and preferably of 2 to 5 g/10 min at 230°C/2.16 kg, and a ratio of the intrinsic viscosity of the modified propylene polymer to the intrinsic viscosity of the basic unmodified polymer (component a) with largely the same weight average molecular weight of 0,2 to 0,95.
These modified poylpropylene polymers normally exhibit strain hardening behaviour as usually defined in the literature.

[0013] Examples for tetrafluoroethylene polymers, optionally contained in the non-postdrawn poly-olefin fibers, are polytetrafluoroethylene, tetrafluoroethylene propylene copolymers and tetrafluoroethylene isobutylene copolymers.

[0014] Examples for polycarbonates, optionally contained in the non-postdrawn polyolefin fibers, are poly (4,4'-isopropylidenediphenylene carbonate) and copolycondensates based on 4,4'-isopropylidenebisphenol, 4,4'-tetrabromoisopropylidenebisphenol and/or 4,4'-hexabromoiso-propylidenebisphenol.

[0015] Examples for 3-methylbutene polymers, optionally contained in the non-postdrawn poly-olefin fibers, are poly-3-methylbutene, 3-methylbutene 1-butene copolymers or 3-methyl-butene isobutylene copolymers.

[0016] Examples for 4-methylpentene-1-polymers, optionally contained in the non-postdrawn poly-olefin fibers, are poly-4-methylpentene-1, 4-methylpentene-1 styrene copolymers or 4-methylpentene-1 propylene copolymers.

[0017] Examples for polyphenyleneoxides, optionally contained in the non-postdrawn polyolefin fibers, are poly-2,6-dimethylphenyleneoxide, poly-2,6-diisopropylphenyleneoxide or poly-2,6-diphenylphenyleneoxide.

[0018] Examples for C_7-C_{13} benzoic acid derivatives, optionally contained in the non-postdrawn polyolefin fibers, are benzoic anhydride, o-toluic acid and 2,6-dimethylbenzoic acid.

[0019] Examples for sorbitol derivatives, optionally contained in the non-postdrawn polyolefin fibers, are di-(p-methylbenzylidene) sorbitol, trinaphthylidenesorbitol and naphthylmethylenesorbitol.

[0020] A preferred cyclic calcium phosphate compound, optionally contained in the non-postdrawn polyolefin fibers, is bis(2,6-di-tert.butyl-1-hydroxy)methane calcium phosphate.

[0021] Preferred auxiliary materials are 0.01 to 2.5% by weight of stabilizers and/or 0.01 to 1% by weight of processing aids and/or, optionally, 0. 1 to 1 % by weight of antistatic agents and/or 0.2 to 3 % by weight of pigments and/or 2 to 20% by weight of flame retardants, in each case based on the sum of the polypropylenes.

[0022] The stabilizers, contained in the inventive non-postdrawn polyolefin fibers, preferably are mixtures of 0.01% to 0.6% by weight of phenolic antioxidants, 0.01% to 0.6% by weight of 3-arylbenzofuranones, 0.01% to 0.6% by weight of processing stabilizers based on phosphites, 0.01 % to 0.6% by weight of high temperature stabilizers based on disulfides and thioethers and/or 0.01% to 0.8% by weight of sterically hindered amines (HALS).

[0023] Suitable phenolic antioxidants are 2-t-butyl-4,6-dimethylphenol, 2,6-di-t-butyl-4-methylphenol, 2,6-di-t-butyl-4-isoamylphenol, 2,6-di-t-butyl-4-ethylphenol, 2-t-butyl-4,6-diisopro-pylphenol, 2,6-dicyclopentyl-4-methylphenol, 2,6-di-t-butyl-4--methoxymethylphenol, 2-t-butyl-4,6-dioctadecylphenol, 2,5-di-t-butylhydroquinone, 2,6-di-t-butyl-4,4-hexadecyloxyphe-nol, 2,2'-methylene-bis(6-t-butyl-4-methylphenol), 4,4'--thio-bis-(6-t-butyl-2-methylphenol), octade-cyl 3(3,5-di-t-butyl-4-hydroxyphenyl) propionate, 1,3,5-trimethyl-2,4,6-tris(3',5'-di-t-bu-tyl-4-hydroxybenzyl)benzene and/or pentaerythritol-tetrakis-3-(3,5-di-t-butyl-4-hydroxyphenyl)-propionate.

[0024] As benzofuranone derivative, 5,7-di-t-butyl-3-(3,4-dimethylphenyl)-3H-benzofuran-2-one, in particular, is suitable.

[0025] As HALS compounds, bis-2,2,6,6-tetramethyl-4-piperidyl sebacate and/or poly-1,1,3,3-tetra-methylbutyl)-imino)-1,3,5-triazine-2,4-diyl)(2,2,6,6-tetramethylpiperidyl)-amino)-hexamethyle-ne-4-(2,2,6,6-tetramethyl)piperidyl)-imino) are particularly suitable.

[0026] As processing aids, the inventive non-postdrawn polyolefin fibers may contain calcium stea-rate, magnesium stearate and/or waxes.

[0027] A still further object of the present invention is non-postdrawn polyolefin fibers with high tenacity in melt spinning lines comprising plastification extruder, melt distributor, metering pumps, spinnerets, quench box and take up device by melting of propylene polymers at temperatures of about 220 to 325°C, conveying the melt by metering pumps to the spinnerets, extrusion into the quench box and taking up the resulting hot spun fiber, characterized in that the non-postdrawn polyolefin fibers, consist essentially of predominantly isotactic propylene polymers having a crystallisation temperature of > 116°C and 0,001 to 2% by weight, based on the propylene polymers used, of polymers (different from isotactic propylene polymers), selected from the group of tetrafluoroethylene polymers, polycarbonates, polybutyleneterephthalate, polyethyleneterephthalate, 3-methylbutene polymers, 4-methylpentene-1-polymers, syndiotactic propylene polymers, polyphenyleneoxides, propylene-methylbutene copolymers, styrene-acrylonitrile copolymers, polyallyltrimethylsilanes and/or hydrolysed ethylene vinylacetate copolymers and/or mixtures thereof, and optionally 0,001 to 2% per weight of benzoic acid or C_7-C_{13} benzoic acid derivatives and/or 0,001 to 2% by weight of dibenzylidene sorbitol, derivatives of sorbitol and/or diphenylglycine and/or 0,001 to 2% by weight of salts of C_6-C_{18} aliphatic or C_7-C_{13} aromatic carbonic acids, selected from sodium benzoate, tertiary-butylbenzoic acid aluminia salt and/or long chain C_8-C_{18}-carbonic acid salts; 0,001 to 2% by weight of phosphoric acid derivatives, selected from ammonium polyphosphate, cyclic calcium phosphate compounds, sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl)phosphate and/or bis-(tertiary-butyl) phos-phoric acid sodium salt; and/or 0,001 to 2% by weight of talc, the fibers spun at spinning speeds of 1000 - 6000 m/min having tenacity values of 2,0 to 5,0 cN/dtex.

[0028] As plasticising extruder for melting the mixtures, especially single screw extruders or twin screw extruders with screw length of 28 to 30 D, preferably with flange-mounted static or dynamic mixers, are suitable. Sheer speeds can be adjusted to values of 10^2 /sec to 10^3/sec by controlling the temperature and the rpm.

[0029] For uniformly metering the mixtures, which has been melted in the plasticizing extruder, over the melt distributor to the capillary die, melt pumps, preferably heated with biphenyl, are used for the melts, heated to 240° to 310°C.

[0030] According to a feature of the present invention, the resulting hot spun fibers are taken up by high speed galettes, cabling the fibers into multifilament yarns and winding up the non-postdrawn polyolefin fibers containing yarns.

[0031] Preferred applications of the non-postdrawn polyolefin fibers are the manufacturing of nonwovens, preferred spunbond, carded or air bonded nonwovens; textile applications, carpets.

Examples

[0032] For the production of polyolefin fibers, which are not drawn subsequently, the inventive method is explained, by way of example, by a method outlined in Fig. 1. In Fig. 1, 1 is the extruder, 2 the extrusion pump, 3 the spinnert, 4 the blast shaft, 5 the pull-off equipment and 6 the winder.

[0033] As extruder (1) for melting the polyolefin mixtures, a single screw extruder is used with a high homogenizing effect with a screw length of 34 D and a flange-mounted static mixer. The spinneret (3) has an internal diameter of 0.5 mm. In the pull-off equipment (5), the pulling-off can be accomplished directly by means of the winder (6). Possible pull-off speeds are 1,000 to 6000 m/min.

Example 1

[0034] For producing a polyolefin polymer blend for high speed melt spinning, a dry mixture consisting of 85% by weight of a metallocene propylene homopolymer (melt index of 6.2 g/10 minutes at 230°C/2.16 kg), 13% by weight of a propylene ethylene copolymer (melt index of 4,2 g/10 minutes at 230°C/2.16 kg, ethylene content 4,8% by weight), 2% by weight of a 4-methylpentene-1 propylene copolymer (melt index of 0,25 g/10 minutes at 230°C/5 kg, propylene content 6,8% by weight), and as adjuvants, the percentages in each case based on the sum of the propylene polymers, 0.25% by weight of 2-t-butyl-4,6-diisopropylphenol, 0.2% by weight of bis-2,2,6,6-tetramethyl-4-piperidyl sebacate and 0.2% by weight of calcium stearate, is melt blended at a melt temperature of 230°C in a twin screw extruder and granulated.

[0035] In the spinning equipment of Figure 1, the blend is melted in the extruder at a mass tem-perature of 275 °C. The melt is transferred by the extrusion pump to the spinneret and, at a spinneret temperature of 290°C, drawn off through the blast shaft, which is cooled with compressed air at a temperature of 20°C, and wound up at a speed of 4000 m/min.

[0036] The resulting polypropylene fiber, which is not postdrawn, has a tenacity of 3.6 cN/dtex and a tensile elongation of 105%.

Example 2

[0037] For producing a polyolefin polymer blend for high speed melt spinning, a dry mixture consisting of 90% by weight of a metallocene propylene homopolymer (melt index of 6.2 g/10 minutes at 230°C/2.16 kg), 5% by weight of a random heterophasic propylene ethylene blockcopolymer (melt index of 8 g/10 minutes at 230°C/2.16 kg, ethylene content 33 mol%) 5% by weight of a propylene ethylene copolymer (melt index of 4,2 g/10 minutes at 230°C/2.16 kg, ethylene content 4,8% by weight) and, the percentages in each case based on the sum of the propylene polymers, 0,2% by weight of dibenzylidene sorbitol, 0.25% by weight of 3(3,5-di-t-butyl-4-hydroxyphenyl)propionate, 0.2% by weight of bis-2,2,6,6-tetra-methyl-4-piperidyl sebacate and 0.2% by weight of magnesium stearate, is melt blended at a melt temperature of 220°C in a twin screw extruder and granulated.

[0038] In the spinning equipment of Figure 1, the blend is melted in the extruder at a mass tem-perature of 280°C. The melt is transferred by the extrusion pump to the spinneret and, at a spinneret temperature of 285°C, drawn off through the blast shaft, which is cooled with compressed air at a temperature of 20°C, and wound up at a speed of 3500 m/min.

[0039] The resulting polypropylene fiber, which is not postdrawn, has a tenacity of 3.2 cN/dtex and a tensile elongation of 122%.

Example 3

[0040] For producing a polyolefin polymer blend for high speed melt spinning, a dry mixture consisting of 85% by weight of a metallocene propylene homopolymer (melt index of 6.2 g/10 minutes at 230°C/2.16 kg), 5% of a propylene homopolymer having strain hardening behavior (melt index of 3,5 g/10 minutes at 230°C/2.16 kg, strain hardening according to modified propylene polymer 7 in figure 2), 10% by weight of a Ziegler-Natta propylene homopolymer with high stereospecifity (melt index of 2,5 g/10 minutes at 230°C/2.16 kg), and, the percentages in each case based on the sum of the propylene polymers, 0,35% by weight of sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl)phosphate, 0.25% by weight of 2-t-butyl-4,6-diisopropylphenol, 0.2% by weight of bis-2,2,6,6-tetramethyl-4-piperidyl seba-cate and 0.2% by weight of calcium stearate, is melt blended at a melt temperature of 225°C in a twin screw extruder and granulated.

[0041] In the spinning equipment of Figure 1, the blend is melted in the extruder at a mass tem-perature of 285 °C. The melt is transferred by the extrusion pump to the spinneret and, at a spinneret temperature of 290°C, drawn off through the blast shaft, which is cooled with compressed air at a temperature of 20°C, and wound up at a speed of 3000 m/min.

[0042] The resulting polypropylene fiber, which is not postdrawn, has a tenacity of 3.0 cN/dtex and a tensile elongation of 137%.

Claims

1. Non-postdrawn polyolefin fibers with high tenacity, consisting essentially of predominantly isotactic propylene polymers having a crystallisation temperature of > 116°C (DSC) and 0,001 to 2% by weight, based on the propylene polymers used, of polymers different from isotactic propylene polymers, selected from the group of tetrafluoroethylene polymers, polycarbonates, polybutyleneterephthalate, polyethyleneterephthalate, 3-methylbutene polymers, 4-methylpentene-1-polymers, syndiotactic propylene polymers, polyphenyleneoxides, propylene-methylbutene copolymers, styrene-acrylonitrile copolymers, polyallyltrimethylsilanes and/or hydrolysed ethylene vinylacetate copolymers and/or mixtures thereof, and optionally 0,001 to 2% per weight of benzoic acid or C_7-C_{13} benzoic acid derivatives and/or 0,001 to 2% by weight of dibenzylidene sorbitol, derivatives of sorbitol and/or diphenylglycine and/or 0,001 to 2% by weight of salts of C_6-C_{18} aliphatic or C_7-C_{13} aromatic carbonic acids, selected from sodium benzoate, tertiary-butylbenzoic acid aluminia salt and/or long chain C_8-C_{18}-carbonic acid salts; 0,001 to 2% by weight of phosphoric acid derivatives, selected from ammonium polyphosphate, cyclic calcium phosphate compounds, sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl) phosphate and/or bis-(tertiary-butyl) phos-phoric acid sodium salt; and/or 0,001 to 2% by weight of talc, the fibers having tenacity values of 2,0 to 5,0 cN/dtex.

2. Non-postdrawn polyolefin fibers as claimed in claim 1, wherein said predominantly isotactic propylene polymers are essentially consisting of

   (c) 50 - 100 wt% propylene polymers, preferably propylene homopolymers, produced using Ziegler-Natta catalysts or metallocene catalysts, especially with an Mw/Mn ratio of 2 to 4.5, and/or copolymers of propylene, ethylene and/or α-olefins with 4 to 18 carbon atoms and a propylene content of 80.0 to 99.9% by weight in the form of random copolymers, block copolymers and/or random block copolymers, with melt indexes of 0.5 to 40 g/10 min at 230°C/2.16 kg and preferably of 1 to 5 g/10 min at 230°C/2.16 kg,

(d) 0- 50 wt % of a polyolefin mixture with an Mw/Mn ratio of 2 to 6 and a melt index of 0,5 to 40 g/10 min at 230°C/2.16 kg, essentially consisting of

(b1) 60 to 98% by weight of a crystalline copolymer of 85 to 95% by weight of propylene and 15 to 0.5% by weight of ethylene and/or an α-olefin of the general formula $CH_2 = CHR$, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,

(b2) 2 to 40% by weight of an elastic copolymer of 20 to 70% by weight of ethylene and 80 to 30% by weight of propylene and/or an α-olefin of the general formula CH_2CHR, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,

c) 0 - 30 wt% of highly amorphous polypropylenes or propylene copolymers with a crystalline poly-propylene or crystalline propylene copolymer content of less than 10% by weight, an enthalpy of melting of less than 40 J/g and a melt index of 0.5 to 40 g/10 min at 230°C/2.16 kg, the largely amorphous polypropylene being a homopolymer of propylene and/or a copolymer of propylene of at least 80 mole percent propylene and not more than 20 mol percent of one or more α-olefins of the general formula CH_2CHR, wherein R is a linear or branched alkyl group with 2 to 8 carbon atoms,

(d) 0 - 10 wt% of non-isotactic propylene homopolymers with a melting point of 145° to 165°C, a melt viscosity of 200,000 cps at 190°C and a heat of crystallization of 4 to 10 calories per gram, 35 to 55% by weight being soluble in diethyl ether,

(e) 0 - 30 wt% of modified propylene homopolymers and/or propylene copolymers with melt indexes of 0.5 to 40 g/10 min at 230°C/2.16 kg and preferably of 2 to 5 g/10 min at 230°C/2.16 kg, and a ratio of the intrinsic viscosity of the modified propylene polymer to the intrinsic viscosity of the basic unmodified polymer (component a) with largely the same weight average molecular weight of 0,2 to 0,95.

3. Non-postdrawn polyolefin fibers as claimed in claim 1 or 2, further comprising conventional additives.

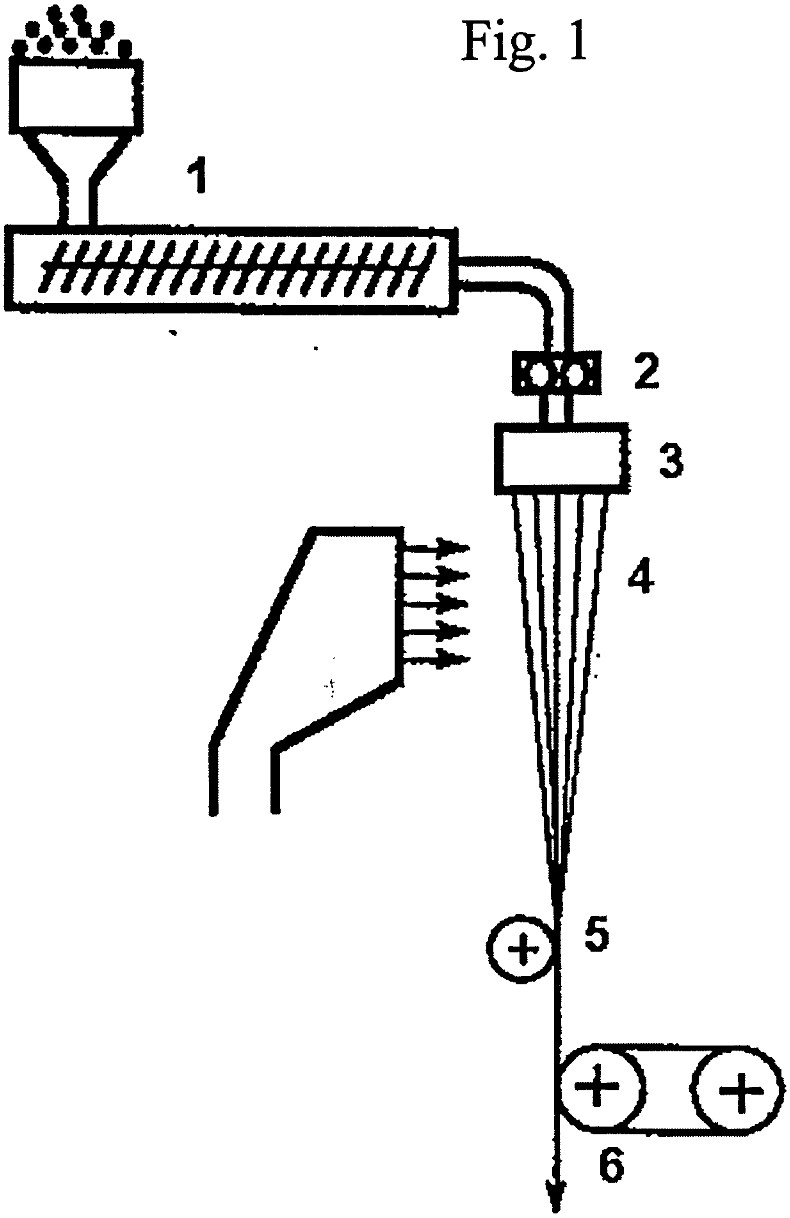
4. Non postdrawn polyolefin fibers as claimed in claim 3, wherein said conventional additives are 0.01 to 2.5% by weight of stabilizers, 0.01 to 1% by weight of processing aids and, optionally, 0. 1 to 1 % by weight of antistatic agents, 0.2 to 3 % by weight of pigments and 2 to 20% by weight of flame retardants, in each case based on the sum of the polypropylenes.

5. Process for preparing non-postdrawn polyolefin fibers with high tenacity in melt spin-ning lines comprising plastification extruder, melt distributor, metering pumps, spinnerets, quench box and take up device by melting of propylene polymers at temperatures of about 220 to 325°C, conveying the melt by metering pumps to the spinnerets, extrusion into the quench box and taking up the resulting hot spun fiber, **characterized in that** the non-postdrawn polyolefin fibers, consist essentially of predominantly isotactic propylene polymers having a crystallisation temperature of > 116°C and 0,001 to 2% by weight, based on the propylene polymers used, of polymers (different from isotactic propylene polymers), selected from the group of tetrafluoroethylene polymers, polycarbonates, polybutylene-terephthalate, polyethyleneterephthalate, 3-methylbutene polymers, 4-methylpentene-1-polymers, syndiotactic propylene polymers, polyphenylene-oxides, propylene-methylbutene copolymers, styrene-acrylonitrile copolymers, polyallyltrimethylsilanes and/or hydrolysed ethylene vinylacetate copolymers and/or mixtures thereof, and optionally 0,001 to 2% per weight of benzoic acid or C_7-C_{13} benzoic acid derivatives and/or 0,001 to 2% by weight of dibenzylidene sorbitol, derivatives of sorbitol and/or diphenylglycine and/or 0,001 to 2% by weight of salts of C_6-C_{18} aliphatic or C_7-C_{13} aromatic carbonic acids, selected from sodium benzoate, tertiary-butylbenzoic acid aluminia salt and/or long chain C_8-C_{18}-carbonic acid salts; 0,001 to 2% by weight of phosphoric acid derivatives, selected from ammonium polyphosphate, cyclic calcium phosphate compounds, sodium-2,2'-methylenebis-(4,6-di-tert.-butylphenyl)phosphate and/or bis-(tertiary-butyl) phosphoric acid sodium salt; and/or 0,001 to 2% by weight of talc, the fibers spun at spinning speeds of 1000 - 6000 m/min having tenacity values of 2,0 to 5,0 cN/dtex.

6. Process for preparing non-postdrawn polyolefin fibers as claimed in claim 5, charac-terised in that the resulting hot spun fiber is taken up by high speed galettes, the fibers are cabled into multifilament yarns and the non-postdrawn polyolefin fibers containing yarns are wound up.

7. Use of non-postdrawn polyolefin fibers of any one of the claims 1 to 4 for manufac-turing of nonwovens, preferred spunbond, carded or air bonded nonwovens; for textile applications, and carpets.

Fig. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 6834

DOCUMENTS CONSIDERED TO BE RELEVANT

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Place of search	Date of completion of the search	Examiner
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