Claims

1. A biaxially oriented polypropylene film comprising a polypropylene composition, wherein the polypropylene composition comprises a homopolymer of propylene (A) having

a content of isotactic pentad fraction of from 93.0 to 99.6 %

a melt flow rate MFR_2 according to ISO 1133 from 0.4 to 10.0 g/10 min,

an aluminium content of more than 0.0 ppm and

a titanium content of more than 0.0 ppm and

an ash content of more than 0.0 to 50.0 ppm, all based on the total amount of the polypropylene composition,

characterized in that the ash contains more than 0.0 up to at most 25.0 wt.-%, based on the total amount of the ash content, of metals selected from elements in IUPAC groups 4 up to and including 13 of the periodic table.

2. The biaxially oriented polypropylene film according to claim 1, wherein the metals are elements of group 4 and/or of group 13, preferably aluminium and/or titan and optionally present in the range 1.0 – 20.0 wt.-% or 3.0 – 15.0 wt.-% based on the total amount of the ash content.

3. The biaxially oriented polypropylene film according to claim 1 or 2, wherein the polypropylene has an aluminium content between above 0.0 to 1.50 ppm, preferably in the range of 0.30 to 1.30, or 0.50 to 1.25 ppm, and/or a titanium content of between above 0.0 to 1.00, preferably in the range of 0.20 to 0.75 ppm or 0.30 to 0.70 ppm

4. The biaxially oriented polypropylene film according to any of the preceding claims, wherein, wherein the ratio of aluminium to titan within the ash is in the range of 0.8 – 3.0, preferably 1.0 – 2.5 or 1.2 – 2.0 and/or
wherein the polypropylene composition has an ash content of 1.0 – 40.0 or 4.0 – 30.0 ppm.

5. The biaxially oriented polypropylene film according to any one of the preceding claims, wherein the polypropylene composition comprises 95.0 to 99.9 wt.-% of the

homopolymer of propylene (A) based on the total weight of the polypropylene composition. and/or the propylene homopolymer (A) has a pentad isotacticity of 96.0 to 98.5 %

6. The biaxially oriented polypropylene film according to any one of the preceding claims, wherein the film comprises

a layer consisting of the polypropylene composition, and/or

the film is stretched simultaneously in machine direction and transverse direction

and wherein the film optionally comprises a metal layer.

7. The biaxially oriented polypropylene film according to any one of the preceding claims having a dielectric breakdown field strength $E_b63.2$, determined according to DIN IEC 60243-2 and obtained as the Scale parameter α of a fitted two-parameter Weibull distribution based on 50 results, measured with active electrode area of 2.84 cm^2 using 250 V/s DC voltage ramp rate on films with a thickness of 3.8–4.2 µm, of between 550 kV/mm and 630 kV/mm, preferably between 570 kV/mm and 620 kV/mm, or between 580 kV/mm and 610 kV/mm.

8. A capacitor comprising an insulation film comprising a layer of the biaxially oriented polypropylene film according to any of the preceding claims.

9. Polypropylene homopolymer having

a content of isotactic pentad fraction of from 93.0 to 99.6 %

a melt flow rate MFR_2 according to ISO 1133 from 0.4 to 10.0 g/10 min,

an aluminium content of more than 0.0 ppm and

a titanium content of more than 0.0 ppm and

an ash content of 0.0 – 50.0 ppm, all based on the total amount of the polypropylene composition,

characterized in that the ash contains more than 0.0 up to at most 25.0 wt.-%, preferably 1.0 – 20.0 wt.-% or 3.0 – 15.0 wt.-% , based on the total amount of the ash content, of metals selected from elements in IUPAC groups 4 up to and including 13 of the periodic table, the metals preferably being aluminium and titan.

10. Polypropylene homopolymer according to claim 9, having an aluminium content between above 0.0 to 1.50 ppm, preferably in the range of 0.30 to 1.30, or 0.50 to 1.25 ppm, and/or
a titanium content of between above 0.0 to 1.00, preferably in the range of 0.20 to 0.75 ppm or 0.30 to 0.70 ppm and/or
a ratio of aluminium to titan within the ash is in the range of 0.8 – 3.0, preferably 1.0 – 2.5 or 1.2 – 2.0

11. A process for producing a biaxially oriented polypropylene film comprising the steps of:

(A) providing a polypropylene composition comprising of
a homopolymer of propylene (A) having a content of isotactic pentad fraction of from 93.0 to 98.0 % and a melt flow rate MFR_2 of from 0.4 to 10.0 g/10.0 min, and having
an aluminium content of more than 0.0 ppm, optionally up to 1.50 ppm and
a titanium content of more than 0.0 ppm, optionally up to 1.00 pppm, and
an ash content of 0.0 – 50.0 ppm, all based on the total amount of the polypropylene composition,
characterized in that the ash contains more than 0.0 up to at most 25.0 wt.-%, preferably 1.0 – 20.0 wt.-% or 3.0 – 15.0 wt.-% , based on the total amount of the ash content, of metals (summed up) selected from elements in IUPAC groups 4 up to and including 13 of the periodic table, the metals preferably being aluminium and titan,

(B) extruding the polypropylene composition to a flat film,

(C) orienting the flat film simultaneously in the machine direction and in the transverse direction to obtain the biaxially oriented polypropylene film, and

(D) recovering the biaxially oriented polypropylene film having a dielectric breakdown field strength Eb63.2 of between 550 kV/mm and 630 kV/mm, which is obtained as the Scale parameter α of a fitted two-parameter Weibull distribution based on 50 results, measured with active electrode area of 2.84 cm^2 using 250 V/s DC voltage ramp rate on films with a thickness of 3.8–4.2 µm.

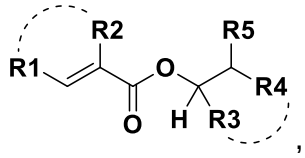
12. The process according to claim 11, wherein the polypropylene composition further comprises equal or above 99.0 wt.-%, based on the total weight of the

polypropylene composition, of the homopolymer of propylene and/or from 0.01 to equal or below 1.0 wt.-%, based on the total weight of the polypropylene composition, of additives.

13. The process according to any one of claims 11 or 12, wherein simultaneous orientation of the flat film in the machine direction and in the transverse direction to obtain the biaxially oriented polypropylene film is conducted in a continuous process and/or wherein the biaxially oriented polypropylene film is a film according to any of the claims 1 to 9.

14. A slurry polymerisation process for the preparation of a polypropylene homopolymer according to claim 9 having a decaline soluble content in the range of 0.0 to 3.5 wt.-%, preferably in the range of 1.0 to 3.0 wt.-% , more preferably in the range of 1.3 to 2.5 wt.-%, wherein the catalyst system comprises:

a) a Ziegler-Natta catalyst,
b) Organoaluminum cocatalyst,
c) External donor of the formula (I)



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wherein

R1 and R2 are independently H or C_1-C_3 saturated or unsaturated hydrocarbyl, optionally linked together to give one or more cyclic structures;

R3 and R4 are independently H or C_1-C_4 hydrocarbyl, optionally linked together to give one or more cyclic structures;

R5 is H or C_1-C_{12} hydrocarbyl,

with the provision that a least one radical of R_3-R_5 is not a hydrogen.

15. Polypropylene homopolymer according to claims 9 or 10 obtainable by the process according to claim 14.