shell impact modifier based on metacrylates, butadiene and styrene (MBS copolymer).

[014] The document US2014/275392 discloses a polyamide moulding compound and moulded articles produced there from. The polyamides moulding compound comprises a functionalized blockcopolymer as impact modifier. Core-shell polymers are used between others polymeric materials as impact modifiers in the comparative examples only.

[Brief description]

[015] Surprisingly it has been found that a polymer composition comprising

a) a transparent polyamide PA and

b) a multistage polymer

characterized that the composition fulfills the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic groups in the multistage polymer and the parameter t is at most *10*, is having an impact strength increase while having a light transmission of at least 75% (for a sheet of 2mm thickness).

[0015a] In an aspect, there is provided a polyamide polymer composition comprising

a) a transparent polyamide PA and

b) a multistage polymer in form of core shell particles having a weight average particle size between 20 nm and 500 nm, where a first stage forms the core, a second or all following stages the respective shells, said multistage polymer comprising one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0 °C and one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60 °C and the weight ratio r_b of the polymer (A1) of the layer comprised in stage (A) in

relation to the complete multi stage polymer is at least 60 wt%,

characterized that the composition fulfils the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic monomers in the multistage polymer and the parameter t is at most 10, and characterized in that the polyamide is amorphous or microcrystalline and the polyamide is transparent by having light transmission of at least 75% when a sheet of 2 mm thickness is measured at 560 nm (ISO13468-1/1996).

[016] Surprisingly it has also been found that a polymer composition comprising

a) a transparent polyamide PA and

b) a multistage polymer

characterized that the composition fulfills the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic groups in the multistage polymer and the parameter t is at most *10*, is having an impact strength increase while still having a haze below 30% (for a sheet of 2mm thickness).

[017] Surprisingly it has additionally been found that a polymer composition comprising

a) a transparent polyamide PA and

b) a multistage polymer

characterized that the composition fulfills the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic groups in the multistage polymer and the parameter t is at most *10*, is having an impact strength increase while still having a haze below 30% and a light transmission of at least 75% (for a sheet of 2mm thickness).

[018] Surprisingly it has also been found that a method for manufacturing a polymer composition comprising the step of blending a transparent polyamide PA and a multistage polymer characterized that the composition fulfils the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic groups in the multistage polymer and the parameter t is at most 10, yields to a polymer composition having an impact strength increase while having a light transmission of at least 75% and still having a haze below 25% (for a sheet of 2mm thickness) in comparison to the same composition with out multistage polymer.

[018a] In another aspect, there is provided a **process for** manufacturing a polyamide polymer composition comprising the step of blending a transparent polyamide PA and a multistage polymer as defined above, characterized that the composition fulfils the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic monomers

Claims

1. Polyamide polymer composition comprising

a) a transparent polyamide PA and

b) a multistage polymer in form of core shell particles having a weight average particle size between 20 nm and 500 nm, where a first stage forms the core, a second or all following stages the respective shells, said multistage polymer comprising one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0 °C and one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60 °C and the weight ratio r_b of the polymer (A1) of the layer comprised in stage (A) in relation to the complete multi stage polymer is at least 60 wt%,

characterized that the composition fulfils the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic monomers in the multistage polymer and the parameter t is at most 10, and characterized in that the polyamide is amorphous or microcrystalline and the polyamide is transparent by having light transmission of at least 75% when a sheet of 2 mm thickness is measured at 560 nm (ISO13468-1/1996).

2. The polymer composition according to claim 1 characterized that the parameter t is at most 1.

3. The polymer composition according to claim 1 or 2 characterized that the polyamide PA has melting enthalpy of less than 7J/g.

4. The polymer composition according to claim 1 or 2 characterized that the polyamide PA has melting enthalpy of at most 3J/g.

5. The polymer composition according to any of claims 1 to 4 characterized that the polyamide PA is represented either by formula (1):

PA XX.YY (1)

wherein XX presents a diamine and YY present a diacid

or by formula (2):

PA Z/ XX.YY (2)

wherein Z represents a lactam L and/or an amino acid A, and XX represents a diamine and YY represents a dicarboxylic acid

or by formula (3b)

PA VV.WW/XX.YY (3b)

wherein VV and XX represents a diamine and WW and YY represents a dicarboxylic acid

16. The polymer composition according to any of claims 5 to 13 characterized that the polyamide PA represented by formula (3b) is chosen from 6.10/B.I, 6.10/B.T, 10.10/B.I, 10.10/B.T, 6.12/B.I, 6.12/B.T, 10.12/B.I, 10.12/B.T, 6.10/P.I, 6.10/P.T, 10.10/P.I, 10.10/P.T, 6.12/P.I, 6.12/P.T, 10.12/P.I, 10.12/P.T, 6.10/B.10, 6.10/B.12, 6.10/B.14, 6.10/B.18, 10.10/B.10, 10.10/B.12, 10.10/B.14, 10.10/B.18, 10.12/B.10, 10.12/B.12, 10.12/B.14, 10.12/B.18, 6.10/P.10, 6.10/P.12, 6.10/P.14, 6.10/P.18, 10.10/P.10, 10.10/P.12, 10.10/P.14, 10.10/P.18, 10.12/P.10, 10.12/P.12, 10.12/P.14, 10.12/P.18, B.10/P.10, B.12/P.12, and B.14/P.14.

17. The polymer composition according to any of claims 5 to 13 characterized that the polyamide PA represented by formula (4) is chosen from 12/B.I/B.T, 11/B.I/B.T, 12/P.I/P.T, 11/P.I/P.T, 12/B.10/B.I, 12/B.10/B.T, 11/B.10/B.I, 11/B.10/B.T, 12/B.12/B.I, 12/B.12/B.T, 11/B.12/B.I, 11/B.12/B.T, 12/P.10/P.I, 12/P.10/P.T, 11/P.10/P.I, 11/P.10/P.T, 12/P.12/P.I, 12/P.12/P.T, 11/P.12/P.I, 11/P.12/P.T, 11/B.10/B.14, 11/P.10/P.14, 11/B.12/B.14, 11/P.12/P.14, 12/B.10/B.14, 12/P.10/P.14, 12/B.12/B.14, 12/P.12/P.14, 11/B.10/B.12, 11/P.10/P.12, 12/B.10/B.12, 12/P.10/P.12, 11/P.12/B.12, 12/P.12/B.12, 11/P.10/B.10, and 12/P.10/B.10.

18. The polymer composition according to any of claims 1 to 17 characterized that the transparent PA does not comprise aromatic groups.

19. The polymer composition according to any of claims 1 to 18 characterized that the composition comprise at least one second polymer.

20. The polymer composition according to claim 19 characterized that the second polymer is chosen from a semicrystalline polyamide, an amorphous polyamide, a semicrystalline

copolyamide, an amorphous copolyamide, a polyetheramide, a polyesteramide and their blends.

21. The polymer composition according to any of claims 1 to 20 characterized that the multistage polymer is comprising one stage (A) comprising a polymer (A1) having a glass transition temperature below -5 °C and one stage (B) comprising a polymer (B1) having a glass transition temperature between 60°C and 150 °C.

22. The polymer composition according to claims 21 characterized that polymer (B1) having a glass transition temperature between 60°C and 150 °C is made in the last stage of the multistage process forming the external layer of the polymer particle having the multilayer structure.

23. The polymer composition according to claim 21 or 22 characterized that the polymer (A1) comprises at least 50wt% of polymeric units coming from isoprene or butadiene.

24. The polymer composition according to any of claims 21 to 23 characterized that the polymer (B1) is a (meth) acrylic polymer.

25. The polymer composition according to any of claims 10 to 13 characterized that the polymer (B1) comprises at least 70wt% monomers chosen from C1 to C12 alkyl (meth)acrylates.

26. The polymer composition according to any of claims 21 to 25 characterized that polymer (A1) is a butadiene homopolymer.

27. The polymer composition according to any of claims 21 to 25 characterized that polymer (A1) is a butadiene-styrene copolymer.

28. The polymer composition according to any of claims 21 to 25 characterized that polymer (B1) comprises no styrene or other aromatic monomer.

29. A **process for** manufacturing a polyamide polymer composition comprising the step of blending a transparent polyamide PA and a multistage polymer according to claim 1, characterized that the composition fulfils the following formula

$$|k - l| \leq t$$

wherein k represents the ratio in mol% of aromatic groups in the polyamide PA, l represents the ratio in mol% of aromatic monomers in the multistage polymer and the parameter t is at most 10, and characterized in that the polyamide is amorphous or microcrystalline and the polyamide is transparent by having light transmission of a sheet of 2 mm thickness that is at least 75% measured at 560 nm (ISO13468-1/1996).

30. The process according to claim 29 characterized that the parameter t is at most 1.

31. Use of the polymer composition according to any of claims 1 to 28 or obtained by the process according to claim 29 or 30 as injection moulding compound for impact modified transparent polyamide composition.

32. Article comprising a composition according to any of claims 1 to 28 in at least one region or one layer.

33. Article according to claim 32, characterized that the article is a moulding, a foil, a profile, a tube, a hollow body, or an optically variable filter, or an optical lens, an ophthalmic lens, an element with spectral filter effect, spectacle lens, sun lens, corrective lens, optical filter, inspection glasses,