0.25µm having high molecular weights of at least 10,000g/mol are mentioned.

[025] None of the prior art documents discloses a composition, a process or use according to the present disclosure.

[Brief description]

[026] Surprisingly it has been found that a composition comprising

a) a fibrous material and

b) a multi stage polymer and

c) a (meth)acrylic polymer (P1),

wherein the quantity of multi stage polymer in the composition is between 3wt% and 50wt% and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol, is suitable for being used in polymeric composite material.

[026a] In an aspect, there is provided a composition comprising

a) a fibrous material and

b) a multi stage polymer and

c) a (meth) acrylic polymer (P1) comprising at least 50 wt% monomers chosen from C1 to C12 alkyl (meth)acrylates,

wherein the quantity of multi stage polymer is between 3wt% and 50wt% of the composition and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol, and

characterized in that the multistage polymer is in form of spherical polymer particles having a weight average particle size between 20nm and 800nm and

characterized in that the multistage polymer comprises

(i) one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0°C,

(ii) one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 30°C, and

characterized in that the (meth) acrylic polymer (P1) is not crosslinked.

[027] Surprisingly it has been found that a preform comprising

a) a fibrous material and

b) a multi stage polymer and

c) a (meth)acrylic polymer (P1),

wherein the quantity of multi stage polymer in the preform is between 3wt% and 50wt% and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol, keeps its shape.

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

a) a fibrous material and

b) a multi stage polymer and

c) a (meth)acrylic polymer (P1),

wherein the quantity of multi stage polymer in the preform is between 3wt% and 50wt% and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol, can be used for manufacturing a polymeric composite material or mechanical or structured parts or articles comprising the polymeric composite material.

[029] Surprisingly it has also been found that a process for manufacturing a composition comprising the steps of

a) bringing into contact a fibrous material and the a multistage polymer and a (meth) acrylic polymer (P1)that has a mass average molecular weight Mw of less than 100 000g/mol,

wherein the quantity of multi stage polymer in the composition is between 3wt% and 50wt% yields to a composition that can used in polymeric composite material.

[029a] In another aspect, there is provided a process for manufacturing the composition as defined above, said process comprising the step of

a) bringing into contact:
a fibrous material,
a multistage polymer
and
a (meth) acrylic polymer (P1) comprising at least 50 wt% monomers chosen from C1 to C12 alkyl (meth)acrylates, and

characterized in that the multistage polymer is in form of spherical polymer particles having a weight average particle size between 20nm and 800nm and

characterized in that the multistage polymer comprises

(i) one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0°C according to the method disclosed in the specification,

(ii) one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 30°C according to the method disclosed in the specification, and

characterized in that the (meth) acrylic polymer (P1) is not crosslinked.

[029b] In another aspect, there is provided the use of the composition as defined above for manufacturing a polymeric composite material or mechanical or structured parts or articles comprising the polymeric composite material.

[Detailed description of the invention]

[030] According to a first aspect, the present invention relates to a composition comprising

a) a fibrous material and

b) a multi stage polymer,

c) a (meth)acrylic polymer (P1),

wherein the quantity of multi stage polymer in the composition is between 3wt% and 50wt% and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol.

[031] According to a second aspect, the present invention relates to a process for manufacturing a preform comprising the steps

a)bringing into contact a fibrous material and the a multistage polymer and a (meth) acrylic polymer (P1)that has a mass average molecular weight Mw of less than 100 000g/mol, wherein the quantity of multi stage polymer in the preform is between 3wt% and 50wt%.

[032] According to a third aspect, the present invention relates to preform comprising

a) a fibrous material and

b) a multi stage polymer,

c) a (meth)acrylic polymer (P1),

wherein the quantity of multi stage polymer in the preform is between 3wt% and 50wt% and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol.

Claims

1. A composition comprising

a) a fibrous material and

b) a multi stage polymer and

c) a (meth) acrylic polymer (P1) comprising at least 50 wt% monomers chosen from C1 to C12 alkyl (meth)acrylates,

wherein the quantity of multi stage polymer is between 3wt% and 50wt% of the composition and the (meth) acrylic polymer (P1) has a mass average molecular weight Mw of less than 100 000g/mol, and

characterized in that the multistage polymer is in form of spherical polymer particles having a weight average particle size between 20nm and 800nm and

characterized in that the multistage polymer comprises

(i) one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0°C,

(ii) one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 30°C, and

characterized in that the (meth) acrylic polymer (P1) is not crosslinked.

2. The composition according to claim 1 characterized that the (meth) acrylic polymer (P1) has a mass average molecular weight Mw between 5000g/mol and 70 000g/mol.

3. The composition according to claim 1 or 2 characterized that the quantity of (meth) acrylic polymer (P1) is between 0.15wt% and 47.5wt% based on the sum of the three components a), b) and c).

4. The composition according to any of claims 1 to 3 characterized that the composition is in form of a preform.

5. The composition according to any of claims 1 to 4 characterized that the multistage polymer is preferably in form of spherical polymer particles having a weight average particle size between 25nm and 600nm.

6. The composition according to any of claims 1 to 5 characterized that the quantity of multi stage polymer is at least 6wt%, based on the sum of the three components a), b) and c).

7. The composition according to any of claims 1 to 5 characterized that the quantity of multi stage polymer is at least 7wt%, based on the sum of the three compounds a), b) and c).

8. The composition according to any of claims 1 to 5 characterized that the quantity of multi stage polymer is between 5wt% and 30wt% of the composition.

9. The composition according to any of claims 1 to 5 characterized that the quantity of multi stage polymer is between 7wt% and 25wt% of the composition, based on the sum of the three compounds a), b) and c).

10. The composition according to any of claims 1 to 9 characterized that the multi stage polymer comprises

    i) one stage (A) comprising a polymer (A1) having a glass transition temperature of less than −5°C

    ii), one stage (B) comprising a polymer (B1) having a glass transition temperature of between 30°C and 150°C.

11. The composition according to claims 10 characterized that the polymers (A1) and (B1) are acrylic or methacrylic polymers.

12. The composition according to claim 10 characterized that the polymer (A1) is a silicone rubber based polymer.

13. The composition according to claim 10 characterized that the polymers (A1) comprises at least 50wt% of polymeric units coming from isoprene or butadiene.

14. The composition according to any of claims 9 to 13 characterized that the stage (A) is the first stage and that stage (B) comprising polymer (B1) is grafted on stage (A) comprising polymer (A1).

15. The composition according to any of claims 1 to 14 characterized that the (meth) acrylic polymer (P1) is not grafted on any other polymer or polymers.

16. The composition according to any of claims 1 to 14 characterized that the (meth) acrylic polymer (P1) comprises at least 50wt% monomers chosen from C1 to C4 alkyl methacrylate and C1 to C8 alkyl acrylate monomers and mixtures thereof.

17. The composition according to any of claims 1 to 14 characterized that the (meth) acrylic polymer (P1) comprises from 50wt% to 100wt% methyl methacrylate.

18. The composition according to any of claims 1 to 14 characterized that the (meth) acrylic polymer (P1) comprises between 0wt% and 50wt% of a functional monomer.

19. A process for manufacturing the composition according to any of claims 1 to 18, said process comprising the step of

a) bringing into contact:

a fibrous material,

a multistage polymer

and

a (meth) acrylic polymer (P1) comprising at least 50 wt% monomers chosen from C1 to C12 alkyl (meth)acrylates, and

characterized in that the multistage polymer is in form of spherical polymer particles having a weight average particle size between 20nm and 800nm and

characterized in that the multistage polymer comprises

(i) one stage (A) comprising a polymer (A1) having a glass transition temperature of less than 0°C according to the method disclosed in the specification,

(ii) one stage (B) comprising a polymer (B1) having a glass transition temperature of at least 30°C according to the method disclosed in the specification, and

characterized in that the (meth) acrylic polymer (P1) is not crosslinked.

20. The process according to claim 19, characterized that step a) is made by dipping, infusion or impregnation of the fibrous material with an aqueous dispersion comprising the multistage polymer and (meth) acrylic polymer (P1).

21. The process according to claim 19, characterized that the process comprises the additional step b) drying the product of step a).

22. The process according to claim 20, characterized that step a) is made by powdering the fibrous material with a powder comprising the multistage polymer and (meth) acrylic polymer (P1).

23. The process according to any of claims 20 to 22, characterized that the process comprises the additional step c) heating the composition.

24. Use of the composition according to any of claims 1 to 18 for manufacturing a polymeric composite material or mechanical or structured parts or articles comprising the polymeric composite material.