particle comprises a shell layer containing a polymer having an alicyclic hydrocarbon group.

[023] None of the prior art documents discloses composition comprising a simple multistage polymer having only one shell above the rubber like polymer, said shell polymer is comprising monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20, notably a shell polymer that is comprising less then 50wt% of monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20, and notably in powder form having a certain porosity and grafted and extractible part.

[Brief description of the disclosure]

[023a] In one aspect, the present disclosure refers to a polymer composition (PC1) comprising

a) a polymer (A1) having a glass transition temperature of less than 10°C,

b) a polymer (B1) having a glass transition temperature of at least 60°C, said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only,

the component a) and the component b) of composition (PC1) are part of a multistage polymer (MP1) and the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol, characterized in that the polymer (B1) comprise polymerized monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[024] Surprisingly it has been found that a polymer composition (PC1) comprising

a) a polymer (A1) having a glass transition temperature of less than 10°C,

b) a polymer (B1) having a glass transition temperature of at least 60°C, said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only,

the component a) and the component b) of composition (PC1) are part of a multistage polymer (MP1) and the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol, characterized in that the polymer (B1) comprise polymerized monomer units comprising an alicyclic hydrocarbon group with a carbon number

from 3 to 20; yields to a polymer composition that can be easily dispersed in low polar liquid compositions and yielding to a liquid composition possessing a lower viscosity compared to a liquid composition with a polymer composition comprising no monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20 or compared to a liquid composition with a polymer composition comprising two or more stages or layers comprising monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[024a] In another aspect, the present disclosure refers to a process for manufacturing the polymer composition as defined above comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C;

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain layer in stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60°C;

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[024b] In another aspect, the present disclosure refers to a process for manufacturing the polymer composition as defined above comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C;

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain layer in stage (B) comprising a

polymer (B1) having a glass transition temperature of at least 60°C;

c) agglomerating the composition obtained in steps a) to b);

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[025] Surprisingly it has also been found that a process for manufacturing the polymer composition (PC1) in form of a polymer powder comprising the steps of

[027] Surprisingly it has also been found that that a process for manufacturing a liquid polymer composition LPC1 comprising the steps of

a) providing said polymeric composition (PC1) in form of a porous polymer powder having total intruded volume of at least 1.2 ml/g as measured by mercury porosimetry,

b) bringing into contact the polymeric composition (PC1) with a liquid composition (LC1),

yields to a liquid polymer composition where the polymeric composition (PC1) is homogenously and rapidly dispersed in the liquid composition (LC1).

[027a] In another aspect, there is provided the use of the polymer composition (PC1) as defined above or obtained by the process as defined above as impact modifier.

[027b] In another aspect, there is provided the use of the polymer composition (PC1) as defined above or obtained by the process as defined above as a reduced dispersing time composition.

[027c] In another aspect, the present disclosure refers to a process to reduce the dispersing time of a polymer powder in a low polar liquid composition by using the polymeric composition (PC1) as defined above in form of a polymer powder.

[027d] In another aspect, the present disclosure refers to a polymer composition (PC2) comprising the polymer composition (PC1) as defined above as impact modifier.

[027e] In another aspect, the present disclosure refers to a process to reduce the time of dispersing a polymeric composition (PC1) in a liquid composition comprising the steps of:

a) providing said polymeric composition (PC1) of first aspect in form of a porous polymer powder POW1 having total intruded volume of at least 1.2 ml/g as measured by mercury porosimetry,

b) bringing into contact the polymeric composition (PC1) with a liquid composition (LC1).

[027f] In another aspect, the present disclosure refers to a liquid polymer composition (LPC1) comprising:

a) the polymeric composition (PC1) as defined above, and

b) a liquid composition (LC1).

[027g] In another aspect, the present disclosure refers to a liquid composition (LC2) comprising

a) the polymer composition (PC1) as defined above or obtained by the process as defined above and

b) a monomer (M2a)

characterized in that the polymer composition (PC1) to monomer (M2a) ratio by weight in the liquid composition (LC2) is between 1/99 and 25/75.

[027h] In another aspect, there is provided the use of the polymer composition (PC1) as defined above or obtained by the process as defined above in the field of compositions for UV curing, 3D printing, adhesives, structural adhesives, coatings, solid surface, wind energy and composites (thermoplastic and thermosets).

[Brief description of drawings]

[028] The foregoing and other objects, features and advantages of the present disclosure will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

[FIG. 1] Figure 1 is a graph showing measurement of the viscosity in Pa*s as function of the shear rate of 1/s at 25°C of an example according to an example of the present disclosure and a comparative example.

[FIG. 2] Figure 2 is also a graph showing measurement of the viscosity in Pa*s as function of the shear rate of 1/s at 25°C of an example according to an example of the present disclosure and a comparative example but at another concentration as figure 1.

[Detailed description of the disclosure]

[029] The present disclosure relates to a polymer composition (PC1) comprising

a) a polymer (A1) having a glass transition temperature of less than 10°C,

b) a polymer (B1) having a glass transition temperature of at least 60°C, said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only,

the component a) and the component b) of composition (PC1) are part of a multistage polymer (MP1) and the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol,

characterized in that the polymer (B1) comprise polymerized monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[030] The present disclosure relates to a process for manufacturing the polymer composition (PC1) comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in a stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C,

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain a layer in a stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60°C,

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[031] The present disclosure relates to a process for manufacturing the polymer composition (PC1) in form of a polymer powder comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C;

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain layer in stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60°C;

c) agglomerating the composition obtained in steps a) to b);

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between

10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

[032] The present disclosure relates to the use of a polymer composition (PC1) as impact modifier.

[033] The present disclosure relates to the use of a polymer composition (PC1) as a reduced dispersing time composition.

[034] The present disclosure relates to a process to reduce the dispersing time of a polymer powder in a low polar liquid composition by using the polymeric composition (PC1) in form of a polymer powder.

[035] The present disclosure relates to a polymer composition (PC2) comprising the polymer composition (PC1) as impact modifier.

[036] The present disclosure relates to a process to reduce the time of dispersing a polymeric composition (PC1) in a liquid composition comprising the steps of:

a) providing said polymeric composition (PC1) of first example in form of a porous polymer powder POW1 having total intruded volume of at least 1.2 ml/g as measured by mercury porosimetry,

b) bringing into contact the polymeric composition (PC1) with a liquid composition (LC1).

[037] The present disclosure relates to a liquid polymer composition (LPC1) comprising:

a) polymeric composition (PC1) of first example, and

b) a liquid composition (LC1).

[038] By the term “polymer powder” as used is denoted a polymer in form of a powder comprising powder grains in the range of at least 1µm, said powder grains are obtained by agglomeration of primary

CLAIMS

1. A polymer composition (PC1) comprising
   a) a polymer (A1) having a glass transition temperature of less than 10°C,
   b) a polymer (B1) having a glass transition temperature of at least 60°C, said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only,
   the component a) and the component b) of composition (PC1) are part of a multistage polymer (MP1) and the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol,
   characterized in that the polymer (B1) comprise polymerized monomer units comprising an alicyclic hydrocarbon group with a carbon number from 3 to 20.

2. The polymer composition (PC1) according to claim 1, characterized in that part of polymer (B1) is grafted on polymer (A1).

3. The polymer composition (PC1) according to claim 1, characterized in that at least 3wt% of the polymer (B1) in the multistage polymer (MP1) can be solubilized in a solvent of the copolymer (B1) and extracted.

4. The polymeric composition according to claim 1 to 3, characterized in that each of the polymer (B1) does not comprise moieties coming from chain transfer agents, especially mercaptan based chain transfer agents.

5. The polymer composition (PC1) according to any of claims 1 to 4, characterized in that the polymer composition (PC1) comprises less than 1000ppm of sulphur.

6. A process for manufacturing the polymer composition according to any of claims 1 to 15 comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C;

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain layer in stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60°C;

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

7. A process for manufacturing the polymer composition according to any of claims 1 to 5 comprising the steps of

a) polymerizing by emulsion polymerization of a monomer or monomer mixture (A_m) to obtain one layer in stage (A) comprising polymer (A1) having a glass transition temperature of less than 10°C;

b) polymerizing by emulsion polymerization of a monomer or monomer mixture (B_m) to obtain layer in stage (B) comprising a polymer (B1) having a glass transition temperature of at least 60°C;

c) agglomerating the composition obtained in steps a) to b);

characterized in that said polymer (B1) represents at least 10wt% and at most 40wt% of the composition based on a) and b) only, and that the polymer (B1) has a mass average molecular weight Mw between 10 000g/mol and 500 000g/mol and the monomer or monomer mixture (B_m) comprise a comonomer (Mc_{b1}) said comonomer (Mc_{b1}) comprises an alicyclic hydrocarbon group with a carbon number from 3 to 20.

8. Use of the polymer composition (PC1) according to any of claims 1 to 5 or obtained by the process according to any of claims 6 to 7 as impact modifier.

9. Use of the polymer composition (PC1) according to any of claims 1 to 5 or obtained by the process according to any of claims 6 to 7 as a reduced dispersing time composition.

10. A process to reduce the dispersing time of a polymer powder in a low polar liquid composition by using the polymeric composition (PC1) according to any of claims 1 to 5 in form of a polymer powder.

11. A polymer composition (PC2) comprising the polymer composition (PC1) according to any of claims 1 to 5 as impact modifier.

12. A process to reduce the time of dispersing a polymeric composition (PC1) in a liquid composition comprising the steps of:
a) providing said polymeric composition (PC1) of first aspect in form of a porous polymer powder POW1 having total intruded volume of at least 1.2 ml/g as measured by mercury porosimetry,
b) bringing into contact the polymeric composition (PC1) with a liquid composition (LC1).

13. A liquid polymer composition (LPC1) comprising:
a) the polymeric composition (PC1) according to any of claims 1 to 5, and
b) a liquid composition (LC1).

14. A liquid composition (LC2) comprising
a) the polymer composition (PC1) according to any of claims 1 to 5 or obtained by the process according to any of claims 6 to 7 and
b) a monomer (M2a)
characterized in that the polymer composition (PC1) to monomer (M2a) ratio by weight in the liquid composition (LC2) is between 1/99 and 25/75.

15. Use of the polymer composition (PC1) according to any of claims 1 to 5 or obtained by the process according to any of claims 6 to 7 in the field of compositions for UV curing, 3D printing, adhesives, structural adhesives, coatings, solid surface, wind energy and composites (thermoplastic and thermosets).