

Polymer Composition, its process of preparation, its use and composition comprising it

[Field of the invention]

5 **[001]** The present invention relates to a polymeric composition comprising an impact modifier and a mineral filler and its process of preparation and its use.

10 **[002]** In particular the present invention relates to a polymeric composition comprising an impact modifier and a mineral filler and its use for thermoplastic polymers.

15 **[003]** More particularly the present invention relates to the process of preparation of polymeric composition comprising an impact modifier and a mineral filler and its use for the impact modification of thermoplastic polymers.

[Technical problem]

20 **[004]** Many kind of additives and fillers are used in thermoplastic polymer compositions in general and in halogenated polymer compositions in particular for a large variety of reasons. They can extend the composition, increase stiffness and strength, and shorten cycle times. They prevent hang-up in dies and neutralize the products of degradation. Fillers can also be used to add color, opacity and conductivity or they can be used as a low cost material that lowers the cost of the composition as the filler is less expensive than the other ingredients of the formulation.

25 **[005]** However the addition of additives and filler to thermoplastic polymers, especially when several are added at the same time or mixtures of them, can also change characteristics of that thermoplastic polymer composition in a negative direction, meaning loss or important decrease of certain characteristic or behavior.

30 **[006]** Polymer compositions comprising polymers with specific characteristic (such as polymer composition, glass transition temperature or structure for naming some characteristics) are also used as additives for thermoplastic polymer compositions in general and in halogenated polymer compositions in particular in order to improve the impact resistance of the composition or

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object made out of these various polymers or plastic resin.
Therefor these additives are also called impact modifiers.

[007] The additive polymer composition is compatible with
thermoplastic polymer compositions in general and in halogenated
5 polymer compositions in particular.

[008] Afterwards the thermoplastic polymer compositions in general
and in halogenated polymer compositions in particular comprising
the additives are processed and/or transformed.

[009] The processed and transformed composition are made in
10 polymeric articles or are used as polymeric part in an article.

[010] The objective of the present disclosure is to propose a
polymeric composition which can be added to thermoplastic polymers
as an additive.

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[011] An objective of the present disclosure is also to have a
polymer composition that can be used to increase the impact
strength of thermoplastic polymers.

20 [012] Another objective of the present disclosure is also to have a
polymer composition that can be used to increase the performance
of extruded thermoplastic polymers.

[013] An additional objective of the present disclosure is the
25 reduction of the price of a polymer composition which acts as
impact modifier for thermoplastic polymer compositions by addition
of low cost components without negatively influencing the
performance of the thermoplastic polymer compositions.

30 **[BACKGROUND]Prior art**

[014] The document US 2009/0111915 discloses acrylic copolymers for
use in highly filled compositions. In particular the document
disclosed filled polyvinylchloride (PVC) materials as a
composition for flooring comprising 70wt% to 95wt% filler, 1wt% to
35 15wt%PVC and 0.5wt% to 4wt% of acrylic copolymer or a composition
for siding or pipe comprising 15wt% to 35wt% filler, 50wt% to
95wt%PVC and 0.25 to 6wt% of acrylic copolymer.

[015] The document WO 2010/099160 discloses composite polymer modifiers. The document discloses a composite polymer modifier consisting of 99wt% to 1wt% of inorganic filler and from 1wt% to 99wt% of a polymeric processing aid and 0wt% to 80% of an impact modifier. The impact modifier is optional, however used in some examples. This document discloses no specific advantages about certain impact modifier compositions.

[016] The document WO2007/093565 discloses a hybrid impact modifier comprising an impact modifier and a mineral filler. The document tries to solve the segregation of different components throughout of a powder composition and discloses and claims especially 3 to 20wt% of mineral filler.

[017] None of the prior art documents discloses such a specific composition as the present disclosure.

[Brief description]

[017a] In an aspect, there is provided a polymer composition P1 comprising:

- a) from 29wt% to 60wt% of an inorganic mineral compound (F),
- b) from 40wt% 71wt% of a polymeric impact modifier (IM1) which is a polymer particle having a multilayer structure comprising at least one layer (IM1L1) comprising a polymer (L1) having a glass transition temperature below 0 °C and at least another layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45 °C;

characterized that the two components of a) and b) add up to 100wt% and that the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is at least 85/15.

[017b] In another aspect, there is provided a process for preparing a polymeric composition P1 comprising

- a) from 29wt% to 60wt% of an inorganic compound (F)
- b) from 40wt% 71wt% of a polymeric impact modifier (IM1) which is a polymer particle having a multilayer structure comprising at least one layer (IM1L1) comprising a polymer

(L1) having a glass transition temperature below 0 °C and at least another layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45 °C; characterized that the two components a) and b) add up to 100wt% and that the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is at least 85/15, said process comprises the step of blending the components of a) and b), while the component of b) and at least 83.33wt% of compound a) are in form of a dispersion in aqueous phase during the blending step.

[017c] In another aspect, there is provided a process for preparing a polymeric composition P2 comprising polymer composition P1 as defined above or obtained by a process as defined above,

the said polymeric composition P2 comprises also
d) a thermoplastic polymer TP1
said process comprises the step of
blending the compositions P1 and the thermoplastic polymer TP1.

[017d] In another aspect, there is provided Use of a composition as defined above or obtained by a process as defined above, for increasing the corner weld strength of a thermoplastic polymer TP1.

[017e] In another aspect, there is provided the use of a composition as defined above or obtained by a process as defined above, for processing a polymeric composition P2 that comprises said polymeric composition P1 and a thermoplastic polymer TP1.

[017f] In another aspect, there is provided an article comprising polymer composition P2 obtained by a process as defined above, characterized that the article is a profile, a pipe, a siding, a foam, a film, a sheet, a flooring film or sheet.

[018] Surprisingly it has been found that a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

5 characterized that the two components of a) and b) add up to 100wt%, increases the impact resistance of thermoplastic polymers while still having an acceptable fusion time and yields to a better heat dissipation during the cooling of high speed processing.

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[019] Surprisingly it has also been found that a process for preparing a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

b) from 40wt% 71wt% a polymeric impact modifier (IM1);

15 characterized that the two components of a) and b add up to 100wt%, said process comprises the step of

blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound of a) are in form of a dispersion in aqueous phase during the blending step; yields to a polymer composition that increases the impact resistance of thermoplastic polymers while still having an acceptable fusion time and yields to a better heat dissipation during the cooling of high speed processing.

[020] Surprisingly it has also been found that a process for preparing a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b add up to 100wt%, said process comprises the step of

i) blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound of a) are in form of a dispersion in aqueous phase during the blending step;

ii) drying the blend obtained in step i);

yields to a polymer composition that increases the impact resistance of thermoplastic polymers while still having an acceptable fusion time and yields to a better heat dissipation during the cooling of high speed processing.

[021] Surprisingly it has also been found that a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%, can be used to increase the impact strength and the corner weld strength of thermoplastic polymers.

[Detailed description of the invention]

[022] According to a first aspect, the present invention relates to a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%.

[023] According to a second aspect, the present invention relates to a polymer composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F),

said inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio (F1)/(F2) is at least 5/1,

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%.

[024] In a third aspect the present invention relates to a process for preparing a polymeric composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of

blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound of a) are in form of a dispersion in aqueous phase during the blending step.

[025] In a fourth aspect the present invention relates to a process for preparing a polymeric composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)

said inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio

(F1)/(F2) is at least 5/1,

b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of

blending the two components of a) and b), while the component of b) and mineral filler (F1) are in form of a dispersion in aqueous phase during the blending step.

[026] In a fifth aspect the present invention relates to a process for preparing a polymeric composition P1 comprising

- a) from 29wt% to 60wt% of an inorganic compound (F),
- b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

5 characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of

- i) blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound a) are in form of a dispersion in aqueous phase during the blending
10 step,
- ii) drying the blend obtained in step i).

[027] In a sixth aspect the present invention relates to a process for preparing a polymeric composition P1 comprising

- 15 a) from 29wt% to 60wt% of an inorganic compound (F)
said inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio (F1)/(F2) is at least 5/1,

- b) from 40wt% 71wt% of a polymeric impact modifier (IM1);

20 characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of

- i) blending the components a) and b) while the component of b) and mineral filler (F1) are in form of a dispersion in aqueous phase during the blending step.
- 25 ii) drying the blend obtained in step i).

[028] In a seventh aspect the present invention relates to a process for preparing a polymeric composition P2 comprising polymer composition P1, said polymer composition P1 comprises

- 30 a) from 29wt% to 60wt% of an inorganic compound (F)
 - b) from 40wt% 71wt% of a polymeric impact modifier (IM1),
- characterized that the two components of a) and b) add up to 100wt%, and the said polymeric composition P2 comprises also

- d) a thermoplastic polymer TP1
- 35 said process comprises the step of
blending the compositions P1 and the thermoplastic polymer TP1.

[029] In an eighth aspect the present invention relates to the use of a polymeric composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)

5 b) from 40wt% 71wt% of a polymeric impact modifier (IM1),
characterized that the two of a), and b) add up to 100wt%, for
increasing the corner weld strength of a thermoplastic polymer TP1
comprising said polymeric composition P1.

10 [030] By the term "polymeric composition" as used is denoted that
the composition consists of polymers of at least 40wt%.

[031] By the term "copolymer" as used is denoted that the polymer
consists of at least two different monomers.

15 [032] By the term "(meth)acrylic" in combination with monomers as
used is denoted all kind of acrylic and methacrylic monomers.

[033] By the term "(meth)acrylic polymer" as used is denoted that
the (meth)acrylic polymer comprises essentially polymers
comprising (meth)acrylic monomers that make up 50wt% or more of
the (meth)acrylic polymer

20 [034] By the term "polymer powder" as used is denoted a polymer
comprising powder grain in the range of at least 1 micrometer (μm)
obtained by agglomeration of primary polymer comprising particles
in the nanometer range.

25 [035] By the term "primary particle" as used is denoted a spherical
shape polymer comprising particle in the nanometer range.
Preferably the primary particle has a weight average particle size
between 20nm and 500nm.

30 [036] By "multistage polymer" as used is denoted a polymer formed
in sequential fashion by a multi-stage polymerization process.
Preferred is a multi-stage emulsion polymerization process in
which the first polymer is a first-stage polymer and the second
polymer is a second-stage polymer, i.e., the second polymer is
formed by emulsion polymerization in the presence of the first
emulsion polymer.

35 [037] By the term "dispersion" as used is denoted a colloidal
system with a continuous liquid phase and a discontinuous solid
phase that is distributed throughout the continuous phase.

[038] By the term "emulsion" as used is denoted a liquid/liquid mixture of a liquid discontinuous phase in a liquid continuous phase.

5 [039] By the term "PVC" as used is understood polyvinyl chloride in form of homopolymer or copolymer comprising at least 50wt% of vinyl chloride.

[040] By the term "filler" as used is understood a solid extender added to a polymer in order to enhance properties and/or reduce costs.

10 [041] By the term "flow aid" as used is understood an anti-caking agent, that allows a good flow ability of the powder and avoids caking.

[042] By the abbreviation "phr" is meant parts per hundred parts of resin. For example 15phr of filler in a PVC formulation means that 15
15 15kg of filler are added to 100kg of PVC.

[043] By "that the two components of a) and b) add up to 100wt%" as used, is meant that the ratio of the two components of a) and b) is only calculated from the sum of these two components. If there are other additional components outside of a) and b), they are not
20 taken into account for the calculation of the weight ratio between the two of them.

[044] By saying that a range from x to y in the present invention, it is meant that the upper and lower limit of this range are included, equivalent to at least x and up to y.

25 [045] By saying that a range is between x and y in the present invention, it is meant that the upper and lower limit of this range are excluded, equivalent to more than x and less than y.

[046] **With regard to the polymeric composition P1** of the present
30 invention, it comprises at least two components a) from 29wt% to 60wt% of an inorganic compound (F), b) from 40wt% to 71wt% a polymeric impact modifier (IM1).

[047] The component b) could also be a mixture of several polymeric impact modifiers (IM1) to (IMx). In that case the sum of the
35 respective polymeric impact modifiers in the polymeric composition is from 40wt% to 71wt%. Each polymeric impact modifier is having a

specific different characteristic, as for example composition or morphology.

5 **[048]** Said inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio (F1)/(F2) is at least 5/1.

[049] Preferably the polymeric composition P1 comprises a) between 29wt% and 60wt% of an inorganic compound (F) and b) between 40wt% and 71wt% of polymeric impact modifier (IM1).

10 **[050]** More preferably the composition P1 of the present invention comprises a) between 31wt% and 59wt% of an inorganic compound (F) and b) between 41wt% and 69wt% of polymeric impact modifier (IM1). Still more preferably the composition P1 of the present invention comprises a) between 33wt% and 58wt% of an inorganic compound (F) and b) between 42wt% and 67wt% of polymeric impact
15 modifier (IM1) and again still more preferably the composition of the present invention comprises a) between 35wt% and 55wt% of an inorganic compound (F) and b) between 45wt% and 65wt% of polymeric impact modifier (IM1).

[051] Advantageously the composition P1, of the present invention
20 comprises a) between 40wt% and 55wt% of an inorganic compound (F) and b) between 45wt% and 60wt% of polymeric impact modifier (IM1), more advantageously a) between 40wt% and 54wt% of an inorganic compound (F) and b) between 46wt% and 60wt% of polymeric impact modifier (IM1) and most advantageously a) between 40wt%
25 and 52wt% of an inorganic compound (F) and b) between 48wt% and 60wt% of polymeric impact modifier (IM1).

[052] In one specific embodiment the composition P1 of the present invention comprises a) between 42wt% and 47wt% of an inorganic compound (F) and b) between 53wt% and 58wt% of polymeric impact
30 modifier (IM1).

[053] The polymeric composition P1 according to the invention is preferably in form of a powder comprising the two components. The powder is composed of grains of aggregated particles of the two components. These particles are the primary particles.

35 **[054]** **With regard to the polymer powder** of the invention, it has a volume median particle size D50 between 1µm and 500µm. Preferably the volume median particle size of the polymer powder is between

10µm and 450µm, more preferably between 15µm and 400µm and advantageously between 20µm and 350µm.

[055] The D10 of the particle size distribution in volume is at least 7µm and preferably 10µm.

5 [056] The D90 of the particle size distribution in volume is at most 800µm and preferably at most 500µm.

[057] The powder according to the invention is homogenous in view of the composition concerning the two components.

[058] Homogeneous in the present invention signifies no important variation throughout the composition. If one or several small samples (1g or less) is/are taken from a larger quantity (1kg) of the composition there is no important variation of the composition concerning the weight ratio of the two respective components in the small sample in comparison to other small samples and the global composition of P1. By small sample is meant 0.1wt% or less of the polymeric composition. By no important variation is meant that the variation is less than 30% relative to the global composition. As an example, if the global composition P1 comprises 40wt% of the inorganic compound (F) and 60wt% of the polymeric impact modifier (IM1), a small first sample taken from the global composition that would comprise 35wt% of the inorganic compound (F) and 65wt% of the polymeric impact modifier (IM1) or small second sample taken from the global composition that would comprise 42wt% of the inorganic compound (F) and 58wt% of the polymeric impact modifier (IM1), would signify a homogenous composition as the variation of ratio of the respective components throughout the small samples is within the 30% variation in view of the global composition of the sample.

[059] Preferably the variation of the components within the composition is less than 25%, more preferably less than 20%.

[060] In an ideal case each powder particle or grain comprises all two components a) and b) and is composed of aggregated particles of the two components. The variation of the weight ratio of the two components in a single powder particle or grain could be more important than the variation in the before described small sample.

[061] The polymer composition P1 according to the present invention which is preferably in form of a powder, is more preferably a dry

powder. By dry is meant that the powder has a certain maximum level of humidity.

[062] The dry polymer composition P1 in form of a powder according to the present invention comprises less than 3wt% humidity and preferably less than 1.5wt% humidity and more preferably less than 1.2wt% humidity. The humidity of a polymer composition can be measure with a thermo balance.

[063] The dry polymer composition P1 in form of a powder according to the present invention can comprise additionally a flow aid (F2). The flow aid (F2) is preferably an inorganic compound. Therefore the flow aid (F2) is part of the inorganic compound (F) of the composition P1. The inorganic compound (F) is consisting of the flow aid (F2) and an inorganic filler (F1): $(F) = (F1) + (F2)$ The quantity of the flow aid (F2) is much less important in the polymer composition P1 than the inorganic filler (F1). The quantity of (F1) is at least 5 times more important than the quantity of (F2)

[064] The density of the polymer composition P1 is at least 1.25g/cm³, preferably at least 1.3g/cm³ and more preferably at least 1.33g/cm³.

[065] The density of the polymer composition P1 is at most 1.75g/cm³, preferably at most 1.7g/cm³ and more preferably at most 1.67g/cm³.

[066] Advantageously the density of the polymer composition P1 is between 1.25g/cm³ and 1.75g/cm³, and more advantageously between 1.3g/cm³ and 1.7g/cm³.

[067] With regard to the inorganic compound (F) it is either an inorganic filler or mineral filler (F1) or it comprises both an inorganic filler or mineral filler (F1) and a flow aid (F2).

[068] Preferably the inorganic compound (F) comprises of a mineral filler (F1) and a flow aid (F2). More preferably the weight ratio (F1)/ (F2) is at least 5/1.

[069] With regard to the mineral filler (F1), mention may be made of glass fibers, hollow glass microspheres, inorganic compounds, such as minerals and salts including calcium carbonate (CaCO₃), silica, silicates such as calcium silicate or metasilicate, clay

such as bentonite, mica, talc, alumina trihydrate, magnesium hydroxide, metal oxides, or combinations of two or more thereof.

5 [070] Preferably the mineral filler (F1) is chosen from calcium carbonate, titanium dioxide or calcinated clay, silica (fumed or precipitated), clay, Montmorillonite (nano-clay), zeolite, perlite or any other type of inorganic material that can be obtained as a slurry.

10 [071] More preferably the mineral filler (F1) is chosen from calcium carbonate, calcinated clay, silica (fumed or precipitated), clay, Montmorillonite (nano-clay), zeolite or perlite.

[072] The mineral filler (F1) of the inorganic compound (F) could also be a mixture of several mineral fillers (F1a) to (F1x).

15 [073] In a still more preferred embodiment the mineral filler (F1) is calcium carbonate (CaCO₃).

[074] Advantageously the calcium carbonate is chosen from precipitated calcium carbonate (PCC), grinded natural calcium carbonate (GCC) or nanosized particles of precipitated calcium carbonate (NPCC).

20 [075] The mineral filler (F1) or at least a part of the mineral filler (F1) could also be in form of a slurry for the process for preparing the polymeric composition P1.

25 [076] Preferably the filler (F1) or at least a part of the mineral filler (F1), that is blended with the polymeric impact modifier (IM1), is in form of a slurry.

[077] **As regards the slurry of the mineral filler**, it is a water dispersion of a mineral filler with solid content preferably between 5wt% and 90wt% and advantageously between 50wt% and 80wt%. This water dispersion can contain any specific surfactant, dispersing agent, additive or filler surface treatment that can
30 advantageously improve the quality of the slurry (stability, viscosity or compatibility with the host polymer matrix).

[078] **With regard to the flow aid (F2)** it is an inorganic powder.

35 [079] The flow aid (F2) could also be a mixture of several flow aid (F2a) to (F2x).

[080] Advantageously the flow aid (F2) is chosen from calcium carbonate (CaCO₃).

[081] With regard to the polymeric impact modifier (IM1), it is preferably a polymer particle having a multilayer structure.

[082] The polymer particle having a multilayer structure is more or less spherical shape. The polymer particle has a weight average particle size (diameter) between 20nm and 500nm. Preferably the weight average particle size of the polymer particle is between 50nm and 400nm, more preferably between 75nm and 350nm and advantageously between 80nm and 300nm.

[083] The polymer particle according to the invention is obtained by a multistage process such as two or three stages or more stages, each stage yield to a layer, the whole process yields to a particle with a multilayer structure

[084] The polymeric impact modifier (IM1) in form of the polymeric particle having a multilayer structure comprising at least one layer (IM1L1) comprising a polymer (L1) having a glass transition temperature below 0°C and at least another layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45°C.

[085] More preferably the glass transition temperature T_g of the polymer (L1) is between -100°C and 0°C, even more preferably between -80°C and 0°C and advantageously between -80°C and -20°C and more advantageously between -70°C and -20°C.

[086] Preferably the glass transition temperature T_g of the polymer (L2) is between 60°C and 150°C. The glass transition temperature of the polymer (L2) is more preferably between 80°C and 140°C, advantageously between 90°C and 135°C and more advantageously between 90°C and 130°C.

[087] In order to obtain a sample of the respective polymers (L1) and (L2) they can be prepared alone, and not by a multistage process, for estimating and measuring more easily the glass transition temperature T_g individually of the respective polymers of the respective stages.

[088] The weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is preferably at least 70/30, more preferably

at least 80/20, even more preferably at least 85/15, advantageously at least 86/14, more advantageously 87/13, even more advantageously 88/12 and most advantageously 89/11.

[089] The weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is preferably in a range by weight between 70/30 and 99/1, more preferably between 80/20 and 98/2, even more preferably between 85/15 and 97/3, advantageously between 86/14 and 97/3, more advantageously between 87/13 and 97/2, even more advantageously between 88/11 and 96/4 and most advantageously between 89/11 to 96/4.

[090] Preferably the polymer L1 presents more than 85wt% of the polymeric impact modifier (IM1) and more preferably more than 86wt%.

[091] The multi-layer structure of IM1 can have different structures. The layer (IM1L1) comprising a polymer (L1) having a glass transition temperature below 0°C, can be the core of the polymeric impact modifier (IM1) or an intermediate layer, but never the most outer layer. The layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45°C can be the most outermost layer.

[092] The layer (IM1L2) comprising a polymer (L2) is preferably a (meth) acrylic copolymer comprising at least 50wt% of polymeric units coming from methyl methacrylate.

[093] In a first preferred embodiment of (IM1), the polymer (L1) having a glass transition temperature below 0°C is a (meth) acrylic polymer comprising at least 50wt% of monomers from alkyl acrylates. Preferably the polymer (L2) or the majority of the polymer (L2) of the layer (IM1L2) is grafted on the layer situated below.

[094] More preferably the polymer (L1) comprises a comonomer or comonomers which are copolymerizable with alkyl acrylate, as long as polymer (A1) is having a glass transition temperature of less than 0°C.

[095] The comonomer or comonomers in polymer (L1) are preferably chosen from (meth)acrylic monomers and/or vinyl monomers.

[096] The (meth)acrylic comonomer in polymer (L1) comprises monomers chosen from C1 to C12 alkyl (meth)acrylates. Still more

preferably (meth)acrylic comonomer in polymer (L1) comprises monomers of C1 to C4 alkyl methacrylate and/or C1 to C8 alkyl acrylate monomers.

5 [097] Most preferably the acrylic or methacrylic comonomers of the polymer (L1) are chosen from methyl acrylate, propyl acrylate, isopropyl acrylate, butyl acrylate, tert-butyl acrylate, methyl methacrylate, ethyl methacrylate, butyl methacrylate and mixtures thereof, as long as polymer (L1) is having a glass transition temperature of less than 0°C.

10 [098] Preferably the polymer (A1) is crosslinked. This means that a crosslinker is added to the other monomer or monomers. A crosslinker comprises at least two groups that can be polymerized.

[099] In one specific embodiment polymer (L1) is a homopolymer of butyl acrylate.

15 [0100] In another specific embodiment polymer (L1) is a copolymer of butyl acrylate and at least one crosslinker. The crosslinker presents less than 5wt% of this copolymer.

[0101] More preferably the glass transition temperature T_g of the polymer (L1) of the first embodiment is between -100°C and 0°C, even more preferably between -100°C and -5°C, advantageously between -90°C and -15°C and more advantageously between -90°C and -25°C.

[0102] In a second preferred embodiment the polymer (L1) having a glass transition temperature below 0°C comprises at least 50wt% of polymeric units coming from isoprene or butadiene and the stage or layer (IML1) is the most inner layer of the polymer particle having the multilayer structure. In other words the stage for making the layer (IM1L1) comprising a polymer (L1) is the core of the polymer particle.

25 [0103] By way of example, the polymer (L1) of the core of the second embodiment, mention may be made of isoprene homopolymers or butadiene homopolymers, isoprene-butadiene copolymers, copolymers of isoprene with at most 98 wt% of a vinyl monomer and copolymers of butadiene with at most 98 wt% of a vinyl monomer. The vinyl monomer may be styrene, an alkylstyrene, acrylonitrile, an alkyl (meth)acrylate, or butadiene or isoprene. In one embodiment the core is a butadiene homopolymer.

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[0104] More preferably the glass transition temperature T_g of the polymer (L1) of the second embodiment comprising at least 50wt% of polymeric units coming from isoprene or butadiene is between -100°C and 0°C, even more preferably between -100°C and -5°C, advantageously between -90°C and -15°C and even more advantageously between -90°C and -25°C.

[0105] With regard to the thermoplastic polymer TP1, it is chosen from halogen containing polymers, such as for example polyvinyl chloride, polyamide, polymethyl methacrylate, polystyrene, polycarbonate, polyesters such as polyethylene terephthalate, polybutylene terephthalate, polycyclohexanedimethanol terephthalate, and polyolefins.

[0106] In a first preferred embodiment the thermoplastic polymer TP1 is a halogen containing polymer.

[0107] With regard to the halogen containing polymer, mention may be made of:

[0108] homopolymers and copolymers of vinyl chloride (PVC) and of vinylidene chloride (PVDC), vinyl resins comprising vinyl chloride units in their structure, such as copolymers of vinyl chloride, and vinyl esters of aliphatic acids, especially vinyl acetate, copolymers of vinyl chloride with esters of acrylic and methacrylic acid and with acrylonitrile, copolymers of vinyl chloride with diene compounds and unsaturated dicarboxylic acids or their anhydrides, such as copolymers of vinyl chloride with diethyl maleate, diethyl fumarate or maleic anhydride, post-chlorinated polymers and copolymers of vinyl chloride, copolymers of vinyl chloride and vinylidene chloride with unsaturated aldehydes, ketones and others, such as acrolein, crotonaldehyde, vinyl methyl ketone, vinyl methyl ether, vinyl isobutyl ether and the like; polymers of vinylidene chloride and its copolymers with vinyl chloride and other polymerizable compounds;

[0109] polymers of vinyl chloroacetate and dichlorodivinyl ether; chlorinated polymers of vinyl carboxylate, such as vinyl

- acetate, vinyl propionate, vinyl butyrate, chlorinated polymeric esters of acrylic acid and of α -substituted acrylic acid, such as methacrylic acid, of nitriles, amides, alkyl esters such as acrylonitrile, (meth)acrylamide, methyl (meth)acrylate, butyl acrylate, ethyl acrylate, 2-ethylhexyl acrylate;
- 5 (meth)acrylamide, methyl (meth)acrylate, butyl acrylate, ethyl acrylate, 2-ethylhexyl acrylate;
- [0110] polymers of vinyl aromatic derivatives, such as styrene, dichlorostyrene; chlorinated rubbers;
- [0111] chlorinated polymers of olefins, such as ethylene, propene, 1-butene, (2.2.1)bicyclo heptene-2, (2.2.1)bicyclo hepta-
- 10 diene-2,5;
- [0112] polymers and post-chlorinated polymers of chlorobutadiene and copolymers thereof with vinyl chloride, chlorinated natural and synthetic rubbers, and also mixtures of these polymers with one another or with other polymerizable
- 15 compounds.
- [0113] grafted halogen containing copolymers, where the halogen containing polymer part is grafted on an (meth)acrylic homo or copolymer, in form of a particles, which could be
- 20 crosslinked or not.
- [0114] Preferably the halogen containing polymer is a thermoplastic polymer and not an elastomeric polymer. The glass transition temperature of the thermoplastic polymer is at least 40°C, preferably 50°C.
- 25 [0115] Preferably the halogen in the halogen containing polymer is chosen from fluorine or chlorine and advantageously the halogen is chlorine.
- [0116] The chlorine containing polymer is chosen from among polymers or mixtures of polymers chosen from among homopolymer
- 30 vinyl chlorides such as polyvinyl chloride, polyvinylidene chloride, chlorinated polyvinyl chloride, post-chlorinated polyvinyl chloride and copolymers formed by the polymerisation of a vinyl chloride monomer with up to 40% of a comonomer such as vinyl acetate, vinyl butyrate, vinylidene chloride, propylene, methyl methacrylate and the like, as well as chlorine-containing
- 35 polymers containing other polymers such as chlorinated polyethylene, terpolymers of acrylonitrile, butadiene, styrene,

terpolymers of methyl methacrylate, butadiene, styrene; polyacrylate resins, poly methyl methacrylate resins and terpolymer of alkyl acrylate, methyl methacrylate, butadiene, preferably the chlorine-containing polymer is polyvinyl chloride or post-chlorinated polyvinyl chloride.

[0117] Preferably the chlorine containing polymer is chosen from homo- and copolymers of vinyl chloride (VC); comprising at least 50wt% of VC units, preferably at least 70wt% of VC units, more preferably at least 80wt% of VC units, advantageously at least 85wt% of VC units; or mixtures thereof.

[0118] With regard to the process for preparing a polymeric composition P1 according to the present invention comprising

a) from 29wt% to 60wt% of an inorganic compound (F),
b) from 40wt% to 71wt% of a polymeric impact modifier (IM1);
characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of
blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound of a) are in form of a dispersion in aqueous phase during the blending step.

[0119] With regard to a first preferred process for preparing a polymeric composition P1 according to the present invention comprising

a) from 29wt% to 60wt% of an inorganic compound (F),
b) from 40wt% to 71wt% of a polymeric impact modifier (IM1);
characterized that the two components of a) and b) add up to 100wt%, said process comprises the step of
i) blending the two components of a) and b), while the component of b) and at least 83.33wt% of compound of a) are in form of a dispersion in aqueous phase during the blending step
ii) drying the blend obtained in step i).

[0120] With regard to a second preferred process for preparing a polymeric composition P1 according to the present invention comprising

a) from 29wt% to 60wt% of an inorganic compound (F),
said inorganic compound (F) consists of a mineral
filler (F1) and a flow aid (F2), wherein the weight
ratio (F1)/(F2) is at least 5/1,
5 b) from 40wt% to 71wt% of a polymeric impact modifier (IM1);
characterized that the two components of a) and b) add up to
100wt%, said process comprises the step of
blending the two components of a) and b), while the two
components b) and (F1) are in form of a dispersion in aqueous
10 phase during the blending step.

[0121] More preferably the process for preparing a polymeric
composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)
15 said inorganic compound (F) consists of a mineral
filler (F1) and a flow aid (F2), wherein the weight
ratio (F1)/(F2) is at least 5/1,
b) from 40wt% to 71wt% of a polymeric impact modifier (IM1);
characterized that the two components of a) and b) add up to
20 100wt%, said process comprises the step of
i) blending the two components of a) and b), while the two
components b) and (F1) are in form of a dispersion in aqueous
phase during the blending step,
ii) drying the blend obtained in step i).

25

[0122] Additionally the process can include additionally the step
of recovering the obtained blend of previous step in order to form
a polymer powder or as a polymer powder.

[0123] The quantities of the aqueous dispersion of the two
30 components of a) and b) or (F1) are chosen on the solid content of
each respective dispersion, in order to obtain the composition of
polymeric composition P1 on the solid part.

[0124] The recovering step of the process for manufacturing the
polymer composition according to the invention, is preferably made
35 by coagulation or by spray drying. It is obvious that the spray
drying combines the recovering and drying in one process step.

[0125] In the case of spray drying it is possible to blend or mix the respective dispersions of the components of a) and b) before adding the liquid mixture to the spray drying apparatus. It is also possible to blend or mix the dispersion inside the spray drying apparatus during the recovering step.

[0126] Spray drying is the preferred method for the recovering and/or drying for the process of preparing polymeric composition P1.

[0127] The polymeric composition P1 after drying comprises less than 3wt% humidity and preferably less than 1.5wt% humidity and more preferably less than 1.2wt% humidity.

[0128] The present invention relates also to a process for preparing a polymeric composition P2 comprising polymer composition P1, said polymer composition P1 comprises

a) from 29wt% to 60wt% of an inorganic compound (F)

b) from 40wt% to 71wt% of a polymeric impact modifier (IM1);

characterized that the two components of a) and b) add up to 100wt%, and the said polymeric composition P2 comprises also

d) a thermoplastic polymer TP1

said process comprises the step of

blending the compositions P1 and the thermoplastic polymer TP1.

[0129] Preferably in the process for preparing a polymeric composition P2, the polymer composition P1 is prepared according to the process described earlier.

[0130] The inorganic compound (F), polymeric impact modifier (IM1), polymer composition P1 and thermoplastic polymer TP1 are the same as defined before.

[0131] Preferably blending the compositions P1 and the thermoplastic polymer TP1 is made by means known by one skilled in the art of blending polymeric compositions as dry blending or compounding of components then melt processed.

[0132] The ratio of the polymer composition P1 in the polymeric composition P2 is between 1 and 20phr, preferably between 2 and 15phr, more preferably between 3 and 12phr and advantageously between 3 and 10phr.

[0133] The present invention relates to the use of a polymeric composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)

5 b) from 40wt% to 71wt% a polymeric impact modifier (IM1),
characterized that the two components of a)) and b) add up to 100wt%, for increasing the impact strength of a thermoplastic polymer TP1 and heat dissipation during the cooling of high speed processing.

10 [0134] After the use, the thermoplastic polymer TP1 comprises the polymeric composition P1 and gives polymeric composition P2.

[0135] Preferably in the process for preparing a polymeric composition P2, and the polymer composition P1 is prepared according the processes described earlier.

15 [0136] The inorganic compound (F), the polymeric impact modifier (IM1), polymer composition P1 and thermoplastic polymer TP1 are the same as defined before.

20 [0137] The present invention relates to the use of a polymeric composition P1 comprising

a) from 29wt% to 60wt% of an inorganic compound (F)

b) from 40wt% to 71wt% polymeric impact modifier (IM1),

characterized that the two components of a) and b) add up to 100wt%, for increasing the corner weld strength of polymeric
25 composition P2 that comprises said polymeric composition P1 and a thermoplastic polymer TP1.

[0138] Preferably in the process for preparing a polymeric composition P2, the polymer composition P1 is prepared according the process described earlier.

30 [0139] The inorganic mineral filler (F), polymeric impact modifier (IM1), polymer composition P1 and thermoplastic polymer TP1 are the same as defined before.

[0140] Preferably the transformation of polymeric composition P2 that comprises said polymeric composition P1 and a thermoplastic
35 polymer TP1 is made by extrusion.

[0141] The polymer composition P1 is used in the polymeric composition P2 in a ratio of between 1 and 20phr, preferably

between 2 and 15phr, more preferably between 3 and 12phr and advantageously between 3 and 10phr.

5 [0142] The polymeric composition P2 can be processed and transformed into an article.

[0143] The present invention relates also to an article comprising the polymeric composition P2 as described above. This article can be a profile, a pipe, a siding, a foam, a film, a sheet, a flooring film or sheet.

10

[0144] In a first preferred embodiment the article according to the invention is a profile. In one first advantageously embodiment the article according to the invention is a siding or window profile.

[Methods of evaluation]

15 [0145] Glass transition Temperature

The glass transitions (T_g) of the polymers or mixture of polymers are measured with equipment able to realize a thermo mechanical analysis. A RDAII "RHEOMETRICS DYNAMIC ANALYSER" proposed by the Rheometrics Company has been used. The thermo mechanical analysis
20 measures precisely the visco-elastics changes of a sample in function of the temperature, the strain or the deformation applied. The used frequency is 1Hz. The apparatus records continuously, the sample deformation, keeping the stain fixed, during a controlled program of temperature variation.

25 The results are obtained by drawing, in function of the temperature, the elastic modulus (G'), the loss modulus and the tan delta. The T_g is higher temperature value read in the tan delta curve, when the derived of tan delta is equal to zero.

[0146] For the estimation of volume average powder particle size,
30 particle size distribution and ratio of fine particles a Malvern Mastersizer 300 apparatus with a 300mm lenses, measuring a range from 0.5-880µm is used. The D (v, 0.5) is the particle size at which 50% of the sample has size less then and 50% of the sample have a size larger then that size, or in other words the
35 equivalent volume diameter at 50% cumulative volume. This size is also known as volume medium diameter (abbreviated D50) that is

related to the mass or weight median diameter by the density of the particles assuming a size independent density for the particles.

[0147] Fusion efficiency

5 **[0148]** The fusion efficiency of the polymer composition is estimated by measuring the fusion time with a torque rheometer based on ASTM D2538-02 (reapproved 2010). A shorter fusion time signifies a better fusion efficiency and interpreted as a more efficient process.

10 **[0149] Impact strength**

[0150] The British Standard BSI 2783 method was used to evaluate the single V-notch impact strength. 0.1mm notch radius was used. Impact test were evaluated at controlled room temperature. Pendulum energy was 1J. 10 samples were used to
15 evaluate an average impact energy with its standard deviation.

[0151] The DIN 53753 method was used to evaluate the double V-notch impact strength. 0.1mm notch radius was used. Impact test were evaluated at controlled room temperature. Pendulum energy was 1J. 10 samples were used to evaluate an average impact energy with
20 its standard deviation. Information on the type of failure (Ductile or Fragile) is also given.

[0152] Corner weld strength (CWS)

[0153] Corner welding strength resistance were evaluated using an internal method. After extrusion samples were welded at 240°C
25 under pressure. Specimens were then submitted to a welding resistance at controlled room temperature at 25°C. The average strength at break out of 5 specimens was evaluated.

[0154] Microscopy

[0155] Microscopy on the powder is performed with Scanning
30 Electron Microscopy (SEM). With the detection of back scattered electrons the inorganic filler for example calcium carbonate can be easily detected in each powder grain.

[Examples]

35 **[0156]** Following materials are used or prepared:

[0157] A polymeric impact modifier (IM1) is prepared according to the technique described in U.S. Pat. No. 4,278,576, which employs a standard emulsion polymerization technique.

[0158] As polymeric impact modifier (IM1) a core/shell acrylic polymer impact modifier is prepared employing 89.2 parts of butyl acrylate, 0.4 parts of butylene glycol diacrylate and 0.4 parts of diallylmaleate as elastomeric core, followed by a polymerization of 10 parts of methyl methacrylate. The solid content is 40% of the aqueous dispersion of (IM1a).

[0159] The inorganic mineral filler (F1) is calcium carbonate (CaCO_3). Slurry or dispersion of CaCO_3 is prepared according to the technique described in J.P. Pat. No. 59057913. Namely the slurry is obtained by mixing 270 parts of water, 0.72 parts of sodium polyacrylate and 729.3 parts of CaCO_3 of diam. 0.2 - 0.6 μm and 0.6% moisture and stirring for 20 min at shear rate 5 times 102/s. The obtained solid content is 73wt%.

[0160] As thermoplastic polymer TP1, polyvinylchloride PVC S110P from Kemone is used.

[0161] As flow aid (F2) calcium carbonate (PCC, 0.07 micron) is used.

[0162] The sample compositions according to table 1 are prepared as polymer composition P1 or as compositions for comparative examples in form of powders.

[0163] Comparative example 1: The dispersion of (IM1) and the slurry of inorganic filler (F1) are mixed for with the following ratio, 9.11 kg (9110 parts) of dispersion and 0,705 kg (705 parts) of slurry, and spray dried in the conditions classically used for the latex dispersion alone. The obtained powder as a particle size ~ 150 μm . 3 weight percent calcium carbonate (PCC, 0.07 micron) is added to the recovered powder as a flow aid (F2). The resulting powder has a ratio of 85/15 acrylic impact modifier (IM1)/inorganic compound (F) CaCO_3 .

[0164] Comparative example 2: The dispersion of (IM1) and the slurry of inorganic filler (F1) are mixed for with the following

ratio, 2.679 kg (2679 parts) of dispersion and 3.968 kg (3968 parts) of slurry, and spray dried in the conditions classically used for the latex dispersion alone. The obtained powder as a particle size ~ 150µm. 5 weight percent calcium carbonate (PCC, 0.07 micron) is added to the recovered powder as a flow aid (F2). The resulting powder has a ratio of 25/75 impact modifier (IM1)/inorganic compound (F) CaCO₃.

[0165] Example 1: The two acrylic dispersions and the inorganic slurry are mixed for with the following ratio, 5.305 kg (5305 parts) of impact modifier dispersion (IM1a), 0.617 kg (617 parts) of process aid (meth)acrylic copolymer (A1a) and 2.469 kg (2469 parts) of slurry of inorganic mineral filler (F1), and spray dried in the conditions classically used for the dispersion alone. The obtained powder as a particle size ~ 150µm. 3 weight percent calcium carbonate (PCC, 0.07 micron) is added to the recovered powder as a flow aid (F2). The resulting powder has a ratio of 55/45 polymer/inorganic compound CaCO₃.

[0166] Example 2: The dispersion of (IM1) and the slurry of inorganic filler (F1) are mixed for with the following ratio, 7.902 kg (7902 parts) of dispersion and 1.587 kg (1587 parts) of slurry, and spray dried in the conditions classically used for the latex dispersion alone. The obtained powder as a particle size ~ 150µm. 3 weight percent calcium carbonate (PCC, 0.07 micron) is added to the recovered powder as a flow aid (F2). The resulting powder has a ratio of 70/30 impact modifier (IM1)/inorganic compound (F) CaCO₃.

[0167] Table 1 Composition of powder samples

		IM1	(F1)	Flowaid (F2)	F=F1+F2
		[wt%]	[wt%]	[wt%]	[wt%]
Comparative example 1		85	12	3	15
Comparative example 2		25	70	5	75
Example 1		55	42	3	45
Example 2		70	27	3	30

[0168] The prepared powder samples of comparative examples and examples of table 1 are formulated at 5.5phr in a PVC composition with PVC as thermoplastic polymer TP1. The compositions are dry blended in a Papenmeyer equipment while increasing the temperature. PVC compositions are prepared according to quantities given in table 2.

10 **[0169]** Table 2 - PVC compositions

components	Composition with quantities in phr
PVC (TP1)	100
1pack CaZn	4
CaCo3 filler	8
TiO2	8
Added polymeric composition from respective comparative examples and examples (P1)	5.5

[0170] The different compositions of table 2 where process extruded in a Haake PolyLab extruder. Also the fusion time of each composition was measured.

15 **[0171]** The results for fusion time are summarized in table 3.

[0172] Table 3 - Evaluation of the fusion time of respective examples and comparative examples of table 1 during in composition of table 2

	Fusion time [s]
Comparative example 1	169
Comparative example 2	>200
Example 1	192
Example 2	185

[0173] The examples 1 and 2 still have an acceptable fusion time versus comparative example 1 and much better than comparative example 2.

- 5 [0174] Table 4 - Evaluation of impact properties of the respective examples and comparative examples of table 1 after extrusion processing of composition of table 2.

	Single V-notch impact strength BSI 2783 [kJ/m ²]	Double V- notch impact strength DIN 53753 [kJ/m ²]	% of ductile break	Corner Weld Strength [N]
Comparative example 1	17.1	65.1	100	293
Comparative example 2	12.1	39.1	30	-
Example 1	14.9	53.7	100	331
Example 2	14.6	54.2	100	310

- 10 [0175] The example 1 and 2 show a comparative level in impact strength and a significant increase in corner weld strength.

[0176] Comparative example 1 has much lower corner weld strength.

[0177] Comparative example 2 has a worse impact performance than examples 1 and 2.

Claims

1. A polymer composition P1 comprising:
 - 5 a) from 29wt% to 60wt% of an inorganic mineral compound (F),
 - b) from 40wt% to 71wt% of a polymeric impact modifier (IM1) which is a polymer particle having a multilayer structure comprising at least one layer (IM1L1) comprising a polymer (L1) having a glass transition temperature below 0 °C and at
 - 10 least another layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45 °C;characterized that the two components of a) and b) add up to 100wt% and that the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is at least 85/15.
- 15 2. Composition according to claim 1, wherein the inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio (F1)/(F2) is at least 5/1.
- 20 3. Composition according to claim 1 or 2 comprising
 - a) between 29wt% and 60wt% of an inorganic compound (F),
 - b) between 40wt% and 71wt% a polymeric impact modifier (IM1).
4. Composition according to claim 1 or 2 comprising
 - 25 a) between 31wt% and 59wt% of an inorganic compound (F),
 - b) between 41wt% and 69wt% a polymeric impact modifier (IM1).
5. Composition according to claim 1 or 2 comprising
 - a) between 33wt% and 58wt% of an inorganic compound (F),
 - 30 b) between 42wt% and 67wt% a polymeric impact modifier (IM1).
6. Composition according to claim 1 or 2 comprising
 - a) between 40wt% and 55wt% of an inorganic compound (F),
 - b) between 45wt% and 60wt% a polymeric impact modifier (IM1).
- 35 7. Composition according to claim 1 or 2 comprising
 - a) between 42wt% and 47wt% of an inorganic compound (F),

b) between 53wt% and 58wt% a polymeric impact modifier (IM1).

8. Composition according to any of claims 1 to 7, wherein the composition is in form of a powder having volume median particle size D50 between 1µm and 500µm.
9. Composition according to claim 8, wherein each powder particle comprises the compounds of a) and b).
10. Composition according to any of claims 1 to 9, wherein a small sample of 0.1wt% taken from a larger quantity of the polymeric composition P1 has a variation of less than 30% relative to the global composition of P1 concerning the weight ratio of the two respective components of a) and b).
11. Composition according to any of claims 1 to 10, wherein the polymer (L1) has a glass transition temperature between -100 °C and 0°C and the polymer (L2) has a glass transition temperature between 60°C and 150°C.
12. Composition according to any of claims 1 to 11, wherein the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is preferably in a range by weight between 85/15 and 97/3 and preferably 89/11 to 96/4.
13. Composition according to any of claims 1 to 11, wherein the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is at least 86/14, more preferably 87/13, even more preferably 88/12 and most preferably 89/11.
14. Composition according to any of claims 1 to 11, wherein the weight ratio of layer (IM1L1)/layer (IM1L2) in the multistage polymer is preferably in a range by weight between 86/14 and 97/3, more preferably between 87/13 and 97/2, even more preferably between 88/11 and 96/4.

15. Composition according to any of claims 1 to 14, wherein the polymer L1 presents more than 85wt% of the polymeric impact modifier (IM1).
- 5 16. Composition according to any of claims 1 to 15, wherein the polymer L1 presents more than 86wt% of the polymeric impact modifier (IM1)
- 10 17. Composition according to any of claims 1 to 16, wherein the the polymer (L1) having a glass transition temperature below 0°C is a (meth) acrylic polymer comprising at least 50wt% of monomers from alkyl acrylates.
- 15 18. Composition according to any of claims 1 to 17 wherein at least a part of the inorganic mineral filler (F) is a mineral filler chosen from calcium carbonate, calcinated clay, silica (fumed or precipitated), clay, Montmorillonite (nano-clay), zeolite or perlite, Titanium dioxide.
- 20 19. Composition according to any of claims 1 to 18 wherein the inorganic mineral filler (F) or the mixture of it is chosen from calcium carbonate.
- 25 20. A process for preparing a polymeric composition P1 comprising
a) from 29wt% to 60wt% of an inorganic compound (F)
b) from 40wt% to 71wt% of a polymeric impact modifier (IM1) which is a polymer particle having a multilayer structure comprising at least one layer (IM1L1) comprising a polymer (L1) having a glass transition temperature below
30 0 °C and at least another layer (IM1L2) comprising a polymer (L2) having a glass transition temperature over 45 °C;
characterized that the two components a) and b) add up to 100wt% and that the weight ratio of layer (IM1L1)/layer
35 (IM1L2) in the multistage polymer is at least 85/15, said process comprises the step of

blending the components of a) and b), while the component of b) and at least 83.33wt% of compound a) are in form of a dispersion in aqueous phase during the blending step.

- 5 21. A process according to claim 20, wherein the polymeric composition P1 is comprising
- a) between 31wt% and 59wt% of an inorganic compound (F),
 - b) between 41wt% and 69wt% a polymeric impact modifier (IM1).
- 10
22. A process according to claim 20 or 21, wherein said inorganic compound (F) consists of a mineral filler (F1) and a flow aid (F2), wherein the weight ratio (F1)/(F2) is at least 5/1.
- 15 23. The process according to any of claims 20 to 22, characterized that said process comprises the step of
- i) blending the two components of a) and b), while the two components are in form of a dispersion in aqueous phase during the blending step,
 - 20 ii) drying the blend obtained in step i).
24. A process for preparing a polymeric composition P2 comprising polymer composition P1 according to any of claims 1 to 19 or obtained by a process according to any of claims 20 to 23,
- 25 the said polymeric composition P2 comprises also
- d) a thermoplastic polymer TP1
- said process comprises the step of
- blending the compositions P1 and the thermoplastic polymer TP1.
- 30
25. Use of a composition according to any of claims 1 to 19 or obtained by a process according to any of claims 20 to 23, for increasing the corner weld strength of a thermoplastic polymer TP1.
- 35
26. Use of a composition according to any of claims for 1 to 19 or obtained by a process according to any of claims 20 to 23, for

processing a polymeric composition P2 that comprises said polymeric composition P1 and a thermoplastic polymer TP1.

- 5 27. Article comprising polymer composition P2 obtained by a process according to claim 24, characterized that the article is a profile, a pipe, a siding, a foam, a film, a sheet, a flooring film or sheet.