modulus are observed when some compositions comprise crosslinking agents.

While the abovementioned documents often mention the possible use of crosslinking agent, none gives examples of or describes the properties of compositions comprising them, in particular the advantage presented by the use of crosslinking agent with a view to a combined increase in the flexural modulus and the impact strength.

[Summary]

In an aspect, there is provided a transparent and impact-resistant crosslinked acrylic composition consisting of a brittle matrix (I) having a glass transition temperature of greater than 0°C and of elastomeric domains having a characteristic dimension of less than 100 nm consisting of macromolecular sequences (II) having a flexible nature with a glass transition temperature of less than 0°C, characterized by a number-average molecular weight of between 30 000 and 500 000 g/mol, in which the content of crosslinking agent is between 0.1 and 2% by weight, with respect to the crosslinked polymer material.

In another aspect, there is provided a process for the preparation of a transparent and impact-resistant crosslinked acrylic composition consisting of a brittle matrix (I) having a glass transition temperature of greater than 0°C and of elastomeric domains having a characteristic dimension of less than 100 nm consisting of macromolecular sequences (II) having a flexible nature with a glass transition temperature of less than 0°C, characterized by a number-average molecular weight of between 30 000 and 500 000 g/mol, in which the content of crosslinking agent is between 0.1 and 2% by weight, with respect to the crosslinked polymer material, comprising the following stages:

1. preparing the macromolecular sequences (II) by mixing, with the monomer(s) intended to form the macromolecular sequences (II), an alkoxyamine of general formula $Z(-T)_n$, in which Z denotes a polyvalent group, T denotes a nitroxide and n is an integer greater than or equal to 2;

2. mixing the macromolecular sequences (II) of stage 1 with methyl methacrylate, the crosslinking agent, optionally at least one comonomer M and at least one radical initiator;

3. casting the mixture obtained in stage 2 in a mold and then heating it according to a temperature cycle in order to obtain a cast sheet.

In another aspect, there is provided an item obtained from a composition as defined above.

In a further aspect, there is provided the use of an item as defined above in the fields of windows, noise-reducing walls, flat screens or bathroom fittings.

[Brief description of the invention]

The present invention relates to a transparent and impact-resistant crosslinked acrylic composition consisting of a brittle matrix (I) having a glass transition temperature of greater than 0°C and of elastomeric domains having a characteristic dimension of less than 100 nm consisting of macromolecular sequences (II) having a flexible nature with a glass transition temperature of less than 0°C, characterized by a number-average molecular weight of between 30 000 and 500 000 g/mol.

[Detailed description]

The term "crosslink" is understood to mean a polymer or copolymer, some of its chains of which are connected to one another via covalent bonds or chemical or physical

interactions. These chains, connected to one another, are for the most part distributed in the 3 dimensions of the space.

As regards the matrix (I), this exhibits an overall Tg of greater than 0°C, measured by DSC, and is compatible with the methyl methacrylate homo- or copolymer.

The matrix (I) is prepared from methyl methacrylate and optionally one or more monomer(s) chosen from: