storage for a long period of time.

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PATENT DOCUMENTS

[0004] Patent Document 1: Japanese Unexamined Patent Application Publication No. H07-145291

SUMMARY ~~OF THE INVENTION~~

PROBLEM TO BE SOLVED ~~BY THE INVENTION~~

[0005] The present ~~invention~~ disclosure has been made in consideration of such circumstances. It is an object of the present ~~invention~~ disclosure to provide a method for producing an acrylic rubber capable of realizing excellent storage stability while keeping normal physical properties good.

MEANS FOR SOLVING THE PROBLEM

[0006] The present inventors have intensively studied to achieve the above object. As a result, it has been found that, in a method for producing an acrylic rubber, emulsion polymerization is performed by combining particular two emulsifiers, the obtained polymerized emulsion liquid is coagulated using a metallic sulfate, and the obtained hydrous crumb is washed and dried, whereby an acrylic rubber capable of realizing excellent storage stability while keeping normal physical properties good can be produced.

[0007] In addition, the present inventors have found that the object of the present ~~invention~~ disclosure can be further highly achieved by employing at least one of the following ~~aspects~~examples: the acrylic rubber comprises a cross-linkable functional group, using two emulsifiers in a specific ratio and using a redox-based polymerization catalyst as a polymerization initiator, in particular combining particular two reducing agents, using a monovalent or divalent metal sulfate as a

coagulant, and contacting a polymerized emulsion liquid with a metal sulfate while being warmed and performing washing comprising acid washing. Thus, the present inventors have accomplished the present ~~invention~~disclosure.

[0008] Accordingly, in an aspect, the present ~~invention~~disclosure provides a method for producing an acrylic rubber comprising: an emulsion polymerization step of emulsion polymerizing a monomer comprising a (meth)acrylic acid ester and at least one cross-linkable monomer selected from the group consisting of a carboxyl group-containing monomer, an epoxy group-containing monomer and a halogen group-containing monomer in the presence of a nonionic emulsifier and an anionic emulsifier with a polymerization initiator to obtain a polymerized emulsion liquid; a coagulation step of coagulating the polymerized emulsion liquid by contacting with a metal sulfate to obtain a hydrous crumb; a washing step of performing washing on the hydrous crumb; and a drying step of drying the hydrous crumb that is washed.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the use ratio of the nonionic emulsifier and the anionic emulsifier is in the range of 1/99 to 99/1 in terms of a weight ratio of the nonionic emulsifier/the anionic emulsifier.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the use ratio of the nonionic emulsifier and the anionic emulsifier is in the range of 50/50 to 75/25 in terms of a weight ratio of the nonionic emulsifier/the anionic emulsifier.

[0009] In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the polymerization initiator is used in combination with a reducing agent.

In the method for producing the acrylic rubber of the present

~~invention~~disclosure, it is preferable that at least two compounds are used as the reducing agent.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the metal ion-containing compound in a reduced state and a reducing agent other than the metal ion-containing compound in the reduced state are used in combination as the reducing agent.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the metal ion-containing compound in the reduced state is ferrous sulfate.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the reducing agent other than the metal ion-containing compound in the reduced state is sodium formaldehyde sulfoxylate, ascorbic acid or ascorbate.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the reducing agent other than the metal ion-containing compound in the reduced state is ascorbate.

[0010] In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the polymerization initiator is an organic peroxide or an inorganic peroxide.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that contacting the polymerized emulsion liquid with the metal sulfate is carried out in a manner of adding the metal sulfate to the polymerized emulsion liquid or in a manner of adding the polymerized emulsion liquid into a solution of the metal sulfate or a dispersion of the metal sulfate.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that a contacting temperature of the polymerized emulsion liquid and the metal sulfate is 60 °C or higher.

In the method for producing the acrylic rubber of the present

~~invention~~disclosure, it is preferable that the metal sulfate is a monovalent or divalent metal sulfate.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the anionic emulsifier is a phosphate ester salt.

In the method for producing the acrylic rubber of the present ~~invention~~disclosure, it is preferable that the washing comprises acid washing.

[0011] Further, in another aspect, the present ~~invention~~ disclosure provides an acrylic rubber produced by the method as mentioned above.

In the acrylic rubber of the present ~~invention~~disclosure, it is preferable that a monomer composition is 50 to 99.9 wt% of (meth)acrylic acid ester monomer units, 0.01 to 20 wt% of cross-linkable monomer units, and 0 to 49.99 wt% of other copolymerizable monomer units.

In the acrylic rubber of the present ~~invention~~disclosure, it is preferable that a Mooney viscosity (ML1+4, 100 °C) is in the range of 10 to 150.

[0012] Further, in another aspect, the present ~~invention~~ disclosure provides a rubber composition comprising a rubber ingredient and a cross-linking agent, the rubber ingredient comprising the acrylic rubber as mentioned above.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the cross-linking agent is at least one selected from the group consisting of a polyvalent amine compound, a polyvalent epoxy compound, a polyvalent carboxylic acid, an organic carboxylic acid ammonium salt, an organic carboxylic acid metal salt, an isocyanuric acid compound, a triazine compound, and a metal soap/sulfur.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the rubber composition further comprises a cross-

linking accelerator.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the cross-linking accelerator is at least one selected

from the group consisting of a guanidine-based cross-linking accelerator, a diazabicycloalkene-based cross-linking accelerator, an aliphatic secondary amine-based cross-linking accelerator, an aliphatic tertiary amine-based cross-linking accelerator, and a dithiocarbamate-based vulcanizing accelerator.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the rubber composition further comprises a scorch inhibitor.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the rubber composition further comprises an antioxidant.

In the rubber composition of the present ~~invention~~disclosure, it is preferable that the rubber composition further comprises a filler.

Further, in a further aspect, the present ~~invention~~disclosure provides a cross-linked rubber obtained by cross-linking the rubber composition as mentioned above.

EFFECTS ~~OF INVENTION~~

[0013] According to the present ~~invention~~disclosure, it is possible to provide an acrylic rubber capable of realizing excellent storage stability while keeping normal physical properties good, and a rubber composition containing the acrylic rubber, and the cross-linked rubber.

DESCRIPTION OF EMBODIMENTS

[0014] [Production method]

The method for producing an acrylic rubber of the present invention comprises: an emulsion polymerization step of emulsion polymerizing a monomer comprising a (meth)acrylic acid ester and at least one cross-linkable monomer selected from the group consisting of a carboxyl group-containing monomer, an epoxy group-containing monomer and

a halogen group-containing monomer in the presence of a nonionic emulsifier and an anionic emulsifier with a polymerization initiator to