reducing substance such as a sulfite and a method of adding a prescribed azo compound together with a reducing substance, after the polymerization of a water-soluble ethylenically unsaturated monomer.

[0005]

However, the water-absorbent resin produced in accordance with these methods has a defect in water-absorption capacity, which is an essential quality required for a water-absorbent resin, while the content of residual monomers is suppressed.

PRIOR ART LITERATURES

PATENT LITERATURES

[0006]

Patent Literature 1: Japanese Patent Application Laid-Open No. 2006-176570

Patent Literature 2: Japanese Patent Application Laid-Open No. 2002-105125

Patent Literature 3: Japanese Patent Application Laid-Open No. 64-62317

SUMMARY ~~OF THE INVENTION~~

PROBLEMS TO BE SOLVED ~~BY THE INVENTION~~

[0007]

An object of the present embodiments disclosed herein~~invention~~ is to produce a

water-absorbent resin that shows satisfactory water-absorption capacity while suppressing the content of residual monomers.

[0007a]

In one aspect, there is provided a method for producing a water-absorbent resin, comprising: a polymerization step of polymerizing a polymerizable component containing a water-soluble ethylenically unsaturated monomer dissolved in water using a water-soluble azo-type radical polymerization initiator to obtain a reaction system comprising a water-absorbent resin precursor, and a dehydration step of removing water from the reaction system by heating, wherein, in the dehydration step, a water-soluble radical polymerization initiator is added to the reaction system at any first dehydration stage when the residual water rate calculated by the following formula (1) is 50% or more, and a reducing substance is added to the reaction system at any second dehydration stage when the residual water rate decreases from that at the first dehydration stage by 10% or more:

[Formula 1]

$$\text{Residual Water Rate (\%)} = \frac{\text{Mass of Water Remaining in Reaction System}}{\text{Mass of Water-Soluble Ethylenically Unsaturated Monomer Used in Polymerization Step}} \times 100 \quad (1)$$

MEANS FOR SOLVING THE PROBLEMS

[0008]

A method for producing a water-absorbent resin according to the present disclosure~~invention~~ includes a polymerization step of polymerizing a polymerizable component containing a water-soluble ethylenically unsaturated monomer dissolved in water using a water-soluble azo-type radical polymerization initiator to obtain a reaction system containing a water-absorbent resin precursor, and a dehydration step of removing water from the reaction system by heating. In the dehydration step, a water-soluble radical polymerization initiator is added to the reaction system at any first dehydration stage when the residual water rate calculated by the following formula (1) is 50% or more, and a reducing substance is added to the reaction system at any second dehydration stage when the residual water rate decreases from that at the first dehydration stage by 10% or more.

[0009]

[Formula 1]

persulfate, sodium persulfate, and 2,2'-azobis[2-(N-phenylamidino)propane] dihydrochloride, and the reducing substance is usually at least one selected from the group consisting of sulfurous acid, a sulfite, hydrogen sulfite and a bisulfite.

[0013]

In the production method of the present disclosure~~invention~~, the amount of the water-soluble radical polymerization initiator added to the reaction system is usually preferably set to 0.01 to 0.15 mol% of the total amount of the water-soluble ethylenically unsaturated monomer used in the polymerization step. In addition, the amount of the reducing substance added to the reaction system is usually preferably set to 0.0001 to 0.002 mol% of the total amount of the water-soluble ethylenically unsaturated monomer used in the polymerization step.

[0014]

In an embodiment of the production method of the present disclosure~~invention~~, a water-absorbent resin precursor is subjected to a post-crosslinking treatment in the dehydration step.

[0015]

In the method for producing a water-absorbent resin according to the present disclosure~~invention~~, since a water-soluble radical polymerization initiator and a reducing substance are separately added in a prescribed stage in this order in the

dehydration step of the reaction system, a water-absorbent resin having satisfactory water-absorption capacity can be produced while suppressing the content of residual monomers.

[0016]

The present disclosure~~invention~~ according to another standpoint is directed to a water-absorbent resin, and this water-absorbent resin is obtainable by the production method of the present disclosure~~invention~~. The content of residual monomers in this water-absorbent resin is usually 100 ppm or less. One embodiment of this water-absorbent resin is in powdery form having a mass average particle size of 200 to 600 μm, and has a retention capacity of saline solution of 40 to 60 g/g and an absorption capacity of saline solution under a load of 4.14 kPa of 20 ml/g or more.

[0017]

Since the water-absorbent resin of the present disclosure~~invention~~ is produced by the production method of the present disclosure~~invention~~, the amount of residual monomers is small, and water-absorption capacity is excellent.

[0018]

The present disclosure~~invention~~ according to still another standpoint is directed to a hygienic material. This hygienic material includes a liquid permeable sheet, a liquid impermeable sheet, and an absorbent material retained between these sheets, and the absorbent material contains the

water-absorbent resin of the present disclosure~~invention~~. The absorbent material is, for example, a composite of the water-absorbent resin of the present disclosure~~invention~~ and a hydrophilic fiber.

[0019]

The hygienic material of the present disclosure~~invention~~ uses the water-absorbent resin produced by the production method of the present ~~invention~~disclosure, thus is less likely to cause skin problems due to residual monomers and has excellent water-absorption capacity.

[0020]

Other objects and effects of the present embodiments disclosed herein~~invention~~ will be mentioned in the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021]

[Fig. 1] A schematic view of an apparatus used in Examples for the measurement of a water-absorption capacity under load.

EMBODIMENTS OF THE INVENTION

[0022]

In the method for producing a water-absorbent resin according to the present invention, first, a polymerizable component containing a water-soluble ethylenically unsaturated monomer is polymerized to prepare a water-absorbent resin (polymerization step). The water-absorbent resin