of water-absorbent polymer particles with at least one surface-postcrosslinker and thermal surface-postcrosslinking of the coated water-absorbent polymer particles, wherein the content of residual monomers in the water-absorbent polymer particles prior to the coating with the surface-postcrosslinker is in the range from 0.03 to 15% by weight, and the temperature during the thermal surface-postcrosslinking is in the range from 100 to 180°C.

The present disclosure further provides a process for producing water-absorbent polymer, comprising the steps forming water-absorbent polymer particles by polymerizing a monomer solution, coating of water-absorbent polymer particles with at least one surface-postcrosslinker and thermal surface-postcrosslinking of the coated water-absorbent polymer particles, wherein the content of residual monomers in the water-absorbent polymer particles prior to the coating with the surface-postcrosslinker is in the range from 0.1 to 10% by weight, the surface-postcrosslinker is an alkylene carbonate, and the temperature during the thermal surface-postcrosslinking is in the range from 100 to 180°C.

In an aspect, there is provided a process for producing surface-postcrosslinked water-absorbent polymer particles, comprising the steps forming water-absorbent polymer particles by polymerizing a monomer solution, comprising

(a) at least one ethylenically unsaturated monomer which bears acid groups and may be at least partly neutralized,

(b) optionally one or more crosslinker,

(c) at least one initiator,

(d) optionally one or more ethylenically unsaturated monomers copolymerizable with the monomers mentioned under a),

(e) optionally one or more water-soluble polymers, and

(f) water,

coating of water-absorbent polymer particles with at least one surface-postcrosslinker and thermal surface-postcrosslinking of the coated water-absorbent polymer particles, wherein the content of residual monomers in the water-absorbent polymer particles prior to the coating with the surface-postcrosslinker is in the range from 0.1 to 10% by weight, the temperature during the thermal surface-postcrosslinking is in the range from 100 to 160°C, and the thermal surface-postcrosslinking has a residence time at said temperature of at least 20 minutes.

In another aspect, there is provided a surface-postcrosslinked water-absorbent polymer particles obtainable as defined above.

In an aspect, there is provided a fluid-absorbent article, comprising

(A) an upper liquid-pervious layer,

(B) a lower liquid-impervious layer and

(C) a fluid-absorbent core between the layer (A) and the layer (B), comprising from 5 to 90% by weight fibrous material and from 10 to 95% by weight water-absorbent polymer particles according to any of claims 10 to 25,

(D) an optional acquisition-distribution layer between (A) and (C), comprising from 80 to 100% by weight fibrous material and from 0 to 20% by weight water-absorbent polymer particles according to any of claims 10 to 25,

(E) an optional tissue layer disposed immediately above and/or below (C); and

(F) other optional components.

In another aspect, there is provided a fluid absorbant particle, comprising water-absorbent polymer particles as defined above and less than 15% by weight fibrous material and/or adhesives in the absorbent core.

The present disclosure is based on the finding that the level of residual monomers in the water-absorbent polymer particles prior to the thermal surface-postcrosslinking, the temperature of the thermal surface-postcrosslinking, and the surface-postcrosslinker itself have an important impact on the properties of the formed surface-postcrosslinked water-absorbent polymer particles.

The result of the specific conditions according to the process of the present disclosure are water-absorbent polymer particles having a high centrifuge retention capacity (CRC) and a high absorption under a load of 49.2 g/cm² (AUHL). That is a surprising result. It is known that the centrifuge retention capacity (CRC) significantly decreases during thermal surfacepostcrosslinking as proven by Ullmann's Encyclopedia of Industrial Chemistry, 6th Ed., Vol. 35, page 84, Figure 7. Further surprising is that the less reactive alkylene carbonate reacts under the inventive conditions at unusual low temperatures. Other cyclic surface-postcrosslinkers, for example 2-oxazoliidinone, show a very similar behaviour. According to the monograph "Modern Superabsorbent Polymer Technology", F.L. Buchholz and A.T. Graham, Wiley-VCH, 1998, page 98, the recommended reaction temperatures for alkylene carbonates are in the range from 180 to 215°C.

The combination of having a high centrifuge retention capacity (CRC) and a high absorption under a load of 49.2 g/cm² (AUHL) results in water-absorbent polymer particles having a high total liquid uptake in the wicking absorption test.

The specific conditions result further in water-absorbent polymer particles having a reduced pressure dependency of the characteristic swelling time in the VAUL test at high centrifuge retention capacities (CRC).

In an embodiment, there is provided a surface-postcrosslinked water-absorbent polymer particles as defined above having a centrifuge retention capacity (CRC) from 35 to 75 g/g, an absorption under high

Claims

1. A process for producing surface-postcrosslinked water-absorbent polymer particles, comprising the steps forming water-absorbent polymer particles by polymerizing a monomer solution, comprising

   a) at least one ethylenically unsaturated monomer which bears acid groups and may be at least partly neutralized,
   b) optionally one or more crosslinker,
   c) at least one initiator,
   d) optionally one or more ethylenically unsaturated monomers copolymerizable with the monomers mentioned under a),
   e) optionally one or more water-soluble polymers, and
   f) water,

   coating of water-absorbent polymer particles with at least one surface-postcrosslinker and thermal surface-postcrosslinking of the coated water-absorbent polymer particles, wherein the content of residual monomers in the water-absorbent polymer particles prior to the coating with the surface-postcrosslinker is in the range from 0.1 to 10% by weight, the temperature during the thermal surface-postcrosslinking is in the range from 100 to 160°C, and the thermal surface-postcrosslinking has a residence time at said temperature of at least 20 minutes.

2. A process according to claim 1, wherein the monomer solution comprises at least one crosslinker b).

3. A process according to any of claims 1 or 2, wherein the surface-postcrosslinker is selected from alkylene carbonates, 1,3-oxazolidin-2-ones, bis- and poly-1,3-oxazolidin-2-ones, bis- and poly-1,3-oxazolidines, 2-oxotetrahydro-1,3-oxazines, N-acyl-1,3-oxazolidin-2-ones, cyclic ureas, bicyclic amide acetals, oxetanes, and morpholine-2,3-diones.

4. A process according to any of claims 1 to 3, wherein the ethylenically unsaturated monomer which bears acid groups is an ethylenically unsaturated carboxylic acid.

5. A process according to any of claims 1 to 4, wherein the ethylenically unsaturated monomer which bears acid groups is acrylic acid.

25. Polymer particles according to any of claims 10 to 22, wherein the polymer particles have an average particle diameter from 200 to 550 µm.

26. A fluid-absorbent article, comprising

(A) an upper liquid-pervious layer,
(B) a lower liquid-impervious layer and
(C) a fluid-absorbent core between the layer (A) and the layer (B), comprising from 5 to 90% by weight fibrous material and from 10 to 95% by weight water-absorbent polymer particles according to any of claims 10 to 25,
(D) an optional acquisition-distribution layer between (A) and (C), comprising from 80 to 100% by weight fibrous material and from 0 to 20% by weight water-absorbent polymer particles according to any of claims 10 to 25,
(E) an optional tissue layer disposed immediately above and/or below (C); and
(F) other optional components.

27. A fluid-absorbent article, comprising water-absorbent polymer particles according to any of claims 10 to 25 and less than 15% by weight fibrous material and/or adhesives in the absorbent core.