It was an object of the embodiments disclosed herein to provide an improved process for agglomerating superabsorbent particles, wherein the superabsorbent particles are especially to have a high absorption capacity.

It was a further object of the embodiments disclosed herein to provide an improved process for agglomerating superabsorbent particles, wherein especially excessively small polymer particles ("fines") removed from other processes are utilized.

The object was achieved by a process for agglomerating superabsorbent particles by polymerizing an aqueous monomer solution 1 comprising

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

and optionally drying and/or comminuting the resulting polymer particles, which comprises removing polymer particles having a particle size of 250 µm or less, dispersing the polymer particles removed in a hydrophobic organic solvent, mixing the dispersed polymer particles with an aqueous monomer solution 2 comprising

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

where monomer solution 1 and monomer solution 2 may be the same or different, the total amount of water applied to the dispersed polymer particles being at least 100% by weight, based on the dispersed polymer particles, and polymerizing monomer solution 2.

In an aspect, there is provided a process for agglomerating superabsorbent particles by polymerizing an aqueous monomer solution 1 comprising

a) at least one ethylenically unsaturated monomer which bears acid groups and may have been at least partly neutralized,
b) optionally one or more crosslinkers,
c) at least one initiator,

d) optionally one or more ethylenically unsaturated monomers copolymerizable with the monomers mentioned under a) and
e) optionally one or more water-soluble polymers,

the process comprising dispersing polymer particles having a particle size of 250 µm or less in a hydrophobic organic solvent, mixing the dispersed polymer particles with an aqueous monomer solution 2 comprising

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

where monomer solution 1 and monomer solution 2 may be the same or different, the total amount of water applied to the dispersed polymer particles being at least 100% by weight, based on the dispersed polymer particles, and polymerizing monomer solution 2.

Polymer particles having a particle size of preferably 200 µm or less, more preferably 150 µm or less and most preferably 120 µm or less are removed. The particle size can be removed by means of a sieve having the corresponding mesh size. Polymer particles which pass through a sieve having a mesh size of x µm accordingly have a particle size of x µm or less.

Claims

1. A process for agglomerating superabsorbent particles by polymerizing an aqueous monomer solution 1 comprising

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

the process comprising dispersing polymer particles having a particle size of 250 µm or less in a hydrophobic organic solvent, mixing the dispersed polymer particles with an aqueous monomer solution 2 comprising

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

where monomer solution 1 and monomer solution 2 may be the same or different, the total amount of water applied to the dispersed polymer particles being at least 100% by weight, based on the dispersed polymer particles, and polymerizing monomer solution 2.

2. The process according to claim 1, further comprising the step of drying resulting polymer particles.

3. The process according to claim 1, further comprising the step of drying and comminuting resulting polymer particles.

4. The process according to any of claims 1 to 3, wherein the polymer particles have a particle size of 200 µm or less.

5. The process according to any of claims 1 to 3, wherein the polymer particles have a particle size of 150 µm or less.

6. The process according to any of claims 1 to 5, wherein the amount of water applied with monomer solution 2 is at least 150% by weight, based on the dispersed polymer particles.

7. The process according to any of claims 1 to 5, wherein the amount of water applied with monomer solution 2 is at least 175% by weight, based on the dispersed polymer particles.

8. The process according to any of claims 1 to 7, wherein monomer solution 2 comprises from 0.01 to 0.50 mmol of crosslinker b), based on 1 mol of monomer a).

9. The process according to any of claims 1 to 7, wherein monomer solution 2 comprises from 0.02 to 0.25 mmol of crosslinker b), based on 1 mol of monomer a).

10. The process according to any of claims 1 to 7, wherein monomer solution 2 comprises from 0.05 to 0.15 mmol of crosslinker b), based on 1 mol of monomer a).

11. The process according to any of claims 1 to 10, wherein monomer solution 1 is polymerized by dropletizing polymerization.

12. The process according to claim 11, wherein the polymer particles are removed from the offgas of the dropletizing polymerization by means of a filter or cyclone.

13. The process according to any of claims 1 to 10, wherein monomer solution 1 is polymerized by suspension polymerization and the resulting polymer particles are dried.

14. The process according to any of claims 1 to 10, wherein monomer solution 1 is polymerized by solution polymerization and the resulting polymer particles are dried and comminuted.