Claims:

1. A process for preparing vinyl ester-ethylene copolymers by means of radically initiated polymerization of vinyl esters, ethylene and optionally further ethylenically unsaturated monomers in aqueous medium at a pressure of 5 to 120 bar abs., characterized in that
a) a polymerization mixture is depressurized to a pressure of 1 to 15 bar abs., producing an ethylene-containing gas phase and an aqueous phase containing vinyl esters and vinyl ester-ethylene copolymers,
b) the ethylene-containing gas phase from stage a) is separated off, then absorbed into vinyl esters and the mixture thus obtained is used in the radically initiated polymerization of vinyl esters, ethylene and optionally further ethylenically unsaturated monomers, and
c) the aqueous phase from stage a) is depressurized to a pressure of 0.1 to 0.5 bar abs., forming a gas phase containing vinyl esters and water, which has a temperature of 50°C to less than 80°C and is separated off, then condensed and then used in the radically initiated polymerization of vinyl esters, ethylene and optionally further ethylenically unsaturated monomers.

2. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1, characterized in that the ethylene-containing gas phase of stage a) contains ≥ 75% by weight of ethylene, based on the total weight of the ethylene contained in the polymerization mixture of stage a).

3. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 or 2, characterized in that the gas phase of stage a) contains ≤ 20% by weight of vinyl ester, based on the total weight of the vinyl esters contained in the polymerization mixture of stage a).

4. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 3, characterized in that the depressurization in stage a) and/or stage c) is performed adiabatically.

5. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 4, characterized in that the gas phase formed in stage c) and containing vinyl esters and water has a temperature of 50°C to less than 75°C.

6. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 5, characterized in that the condensation in stage c) is performed at a temperature of 0°C to 15°C.

7. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 4, characterized in that the condensation in stage c) is performed in two stages and the first stage is performed at a temperature of 15°C to 40°C and the second stage is performed at a temperature of 0°C to less than 15°C.

8. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 7, characterized in that the condensate of stage c) contains 25% to 75% by weight of vinyl esters, based on the total weight of the condensate of stage c).

9. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 8, characterized in that the condensate of stage c) contains 25% to 75% by weight of vinyl esters, based on the total weight of the vinyl esters that were contained in the aqueous phase of stage a) containing vinyl esters and vinyl ester-ethylene copolymers.

10. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 8, characterized in that energy is supplied to the aqueous phase from stage a) in stage c) and the condensate of stage c) contains 50% to 100% by weight of vinyl esters, based on the total weight of the vinyl esters that were contained in the aqueous phase of stage a) containing vinyl esters and vinyl ester-ethylene copolymers.

11. The process for preparing vinyl ester-ethylene copolymers as claimed in claim 1 to 10, characterized in that the aqueous phase from stage a) and/or the aqueous phase from stage c) are/is subject to a postpolymerization or stripping.