Claims

1. A process for the purification of a crude acrylic acid composition containing maleic anhydride as an impurity, the process comprising the steps of:

   (a) carrying out at least one dynamic melt crystallization stage (14, 14a, 14b, 14c, 14d) with the crude acrylic acid composition to prepare a first purified acrylic acid composition and a first residue containing at least 3.5 % by weight maleic anhydride,
   (b) adding a solvent (26) which is capable of dissolving maleic anhydride to the first residue in an amount that the weight ratio of the solvent to the maleic anhydride is 0.3 or more to prepare a ratio-adjusted residue and
   (c) carrying out at least one further dynamic melt crystallization stage and/or at least one static melt crystallization stage (18, 18a, 18b) with the ratio-adjusted residue to prepare a second purified acrylic acid composition and a second residue.

2. The process of claim 1, wherein the concentration of maleic anhydride in the first residue prepared in step (a) is at least 4 % by weight, preferably at least 8 % by weight, more preferably at least 12 % by weight and most preferably at least 16 % by weight based on 100 % by weight of the first residue.

3. The process of claim 1 or 2, wherein the weight ratio of the solvent to the maleic anhydride in step (b) is adjusted to a range of from 0.3 to 2.0, preferably of from 0.5 to 1.5, more preferably of from 0.8 to 1.2 and most preferably to about 1.0.

4. The process of any one of the preceding claims, wherein the solvent is water.

5. The process of any one of the preceding claims, wherein the second purified acrylic acid composition obtained in step (c) (18, 18a, 18b) is at least partially recycled (30) to the dynamic melt crystallization of step (a) (14, 14a, 14b, 14c, 14d).

6. The process of any one of the preceding claims, wherein two to four dynamic melt crystallization stages (14a, 14b, 14c, 14d) are used to prepare the first purified acrylic acid composition and the first residue in step (a) and wherein one to three static melt crystallization stages (18a, 18b) are carried out with the ratio-adjusted residue in step (c).

7. The process of claim 6, wherein at least one of the dynamic melt crystallization stages (14a, 14b, 14c, 14d) of step (a) is carried out as falling film crystallization.

8. The process of any one of the preceding claims, wherein the crude acrylic acid composition is produced from propylene,

9. The process of any one of the preceding claims, wherein the crude acrylic acid composition is obtained by a synthesis process comprising at least one fermentation step.

10. The process of any one of the preceding claims, wherein no additional solvent is added to the crude acrylic acid composition before it is subjected to step (a).

11. The process of any one of the preceding claims, wherein in steps (a) to (c) no separation of a precipitated maleic anhydride by a separation means from the crude acrylic acid composition or from the first residue is conducted.