Claims

1. A process for continuous dissolution of a solid in a reaction medium, comprising:
   a) withdrawing a liquid, which is a portion of the reaction medium, from a first reaction vessel;
   b) contacting the liquid withdrawn from the first reaction vessel in a) with a solid in a second reaction vessel to form a solution of the solid, wherein the solid in the second reaction vessel is present in a form of a fixed bed which is traversed by the liquid; and
   c) recycling the solution formed in b) into the first reaction vessel.

2. The process according to claim 1, wherein
the reaction medium comprises a liquid phase or a mixture of gaseous and liquid phases, and gaseous constituents are liquefied during the withdrawal in a).

3. The process according to claim 1, wherein
the reaction medium comprises at least two chemical components, and before or during the withdrawal in a), the reaction medium is subjected to a separation process so that the portion of the reaction medium withdrawn in a) has a different composition to the reaction medium.

4. The process according to claim 1, wherein
the first reaction vessel comprises a rectification column from which the withdrawal in a) is effected.

5. The process according to claim 1, wherein
the liquid traverses the fixed bed from bottom to top in b).

6. The process according to claim 1, wherein
the second reaction vessel comprises two or more fixed beds connected in parallel.

7. The process according to claim 1, wherein
the portion of the reaction medium withdrawn in a) is divided into two substreams, of which only a first of the two substreams is passed through the second reaction vessel and a second of the two substreams is passed by the second reaction vessel as a bypass stream and mixed with the solution formed in b).

8. The process according to claim 1, wherein
respective pressure measurements are performed before and after the second reaction vessel and a thus determined pressure difference is used to determine a fill level of the fixed bed.

9. The process according to claim 1, wherein
the concentration of the solid in the solution obtained in b) is measured continuously by a UV/VIS spectrometer.

10. The process according to claim 1, wherein
the reaction medium comprises:
at least one unsaturated carboxylic anhydride of general formula R–C(O)–O–C(O)–R, in which R represents an unsaturated organic radical having 2 to 12 carbon atoms, at least one unsaturated carboxylic acid of general formula R–COOH in which R is as defined above,
at least one aliphatic carboxylic anhydride, and
at least one corresponding aliphatic carboxylic acid,
wherein R is optionally substituted with any desired number of halogen atoms or cyano groups.

11. The process according to claim 10, wherein
the reaction medium comprises (meth)acrylic acid, (meth)acrylic anhydride, acetic acid, and acetic anhydride.

12. The process according to claim 10, wherein
the solid is phenothiazine.

13. The process according to claim 10, wherein
the first reaction vessel comprises a rectification column, and the withdrawal in a) is effected in a top of the rectification column.

14. The process according to claim 10, wherein
the portion of the reaction medium withdrawn in a) comprises aliphatic carboxylic acids to an extent of at least 90% by weight.

15. The process according to claim 10, wherein
a temperature of the fixed bed is set to a range from 10°C to 80°C.

16. A continuous dissolution system, comprising:
a first reaction vessel comprising a reaction medium, and
a second reaction vessel comprising a solid,
wherein a portion of the reaction medium is withdrawn from the first reaction vessel and introduced to the second reaction vessel, thereby contacting the solid to form a solution of the solid,
wherein the solution is recycled back to the first reaction vessel, and
wherein the solid is present in a form of a fixed bed.

17. The system according to claim 16, wherein the reaction medium comprises (meth)acrylic acid, (meth)acrylic anhydride, acetic acid, and acetic anhydride, and wherein the solid is phenothiazine.