Claims

1. A process for withdrawing polyolefins from a solution polymerization reactor comprising:

(a) providing
- a low pressure separator 1,
- a washing column 2,
- a withdrawal line 3 connecting the upper part of the low pressure separator and the washing column
- a condenser 4,
- a condenser-line 5 connecting the top part of the washing column and the condenser
- optionally a recycle solvent vessel 6
- optionally a solvent-vessel-line 7 connecting the condenser with the recycle solvent vessel
- a reflux line 8 connecting the condenser and the upper part of the washing column or connecting the recycle solvent vessel and the upper part of the washing column
- optionally a circulation line 9 fluidly connected to the middle part of the washing column and recycling line 10
- a recycling line 10 connecting the bottom of the washing column and the upper part of the low pressure separator,
- optionally a wash recycle heater 11 embedded into the recycling line 10
- optionally a heater 12 embedded into the circulation line 9

(b) continuously withdrawing a liquid solution stream from the solution polymerization reactor and passing said liquid solution stream into the first low pressure separator 1;

(c) withdrawing a first vapour stream and a first liquid stream from the low pressure separator and passing said first vapour stream via withdrawal line 3 into the washing column

(d) withdrawing a second vapour stream from the washing column and feeding it via condenser line 5 to condenser 4

(e) cooling the second vapour stream in condenser 4 so that a part of the second vapour stream condenses thereby producing a condensed second vapour stream and an uncondensed second vapour stream

(f) passing the condensed second vapour stream to the upper part of the washing column via reflux line 8

(g) withdrawing a second liquid stream from the washing column and passing at least a part of the second liquid stream to the low pressure separator via recycling line 10

(h) recovering heat from the condenser

2. The process of claim 1, whereby the whole second liquid stream is passed to the low pressure separator.

3. The process of claim 1, whereby a part of the second liquid stream is passed to the low pressure separator and the remaining part of the second liquid stream is passed to the washing column via circulation line 9.

4. The process of claim 3, whereby the remaining part of the second liquid stream which is passed to the washing column is at least partially heated by heater 12.

5. The process according to claim 1, whereby the second liquid stream passed to the low pressure separator is heated by wash recycle heater 11.

6. A process for double stage withdrawing polyolefins from a solution polymerization reactor comprising:

(a) providing
- a first low pressure separator 1,
- a first washing column 2,
- a first withdrawal line 3 connecting the upper part of the first low pressure separator and the first washing column
- a first condenser 4,
- a first condenser-line 5 connecting the top part of the first washing column and the first condenser
- optionally a first recycle solvent vessel 6
- optionally a first solvent-vessel-line 7 connecting the first condenser with the first recycle solvent vessel
- a first reflux line 8 connecting the first condenser and the upper part of the first washing column or connecting the first recycle solvent vessel and the upper part of the first washing column

- optionally a first circulation line 9 fluidly connected to recycling line 10 and the middle part of the washing column
- a first recycling line 10 connecting the bottom of the washing column and the upper part of the first low pressure separator,
- optionally a first wash recycle heater 11 embedded into the recycling line 10
- optionally a first heater 12 embedded into the circulation line 9

further providing

- a second low pressure separator 15,
- a second washing column 16,
- a second withdrawal line 17 connecting the upper part of the second low pressure separator and the second washing column
- a second condenser 18,
- a second condenser-line 19 connecting the upper part of the second washing column and the second condenser
- optionally a second recycle solvent vessel 20
- optionally a second solvent-vessel-line 21 connecting the second condenser with the second recycle solvent vessel
- a second reflux line 22 connecting the second condenser and the upper part of the second washing column or connecting the second recycle solvent vessel and the upper part of the second washing column
- optionally a second circulation line 23 fluidly connected to connecting line 24 and the middle part of the second washing column
- a connecting line 24 connecting the bottom of the second washing column and the first recycling line 10 or low pressure separator 1
- optionally a second heater 25 embedded into the second circulation line 23

(b) continuously withdrawing a liquid solution stream from the solution polymerization reactor and passing said liquid solution stream into the first low pressure separator 1; further passing a second liquid solution stream into the second low pressure separator 15;

(c) withdrawing a first vapour stream A and a first liquid stream A from the first low pressure separator 1 and passing said first vapour stream A via the first withdrawal line 3 into the first washing column 2; further withdrawing a first vapour stream B and a first liquid stream B from the second low pressure separator 15 and passing said first vapour

stream B via the second withdrawal line 17 into the second washing column 16

(d) withdrawing a second vapour stream C from the first washing column 2 and feeding it via the first condenser line 5 to the first condenser 4; further withdrawing a second vapour stream D from the second washing column 16 and feeding it via the second condenser line 19 to the second condenser 18

(e) cooling the second vapour stream C so that a part of the second vapour stream C condenses thereby producing a condensed second vapour stream C and an uncondensed second vapour stream C; further cooling the second vapour stream D so that a part of the second vapour stream D condenses thereby producing a condensed second vapour stream D and an uncondensed second vapour stream D;

(f) passing the condensed vapour stream C to the upper part of the first washing column 2 via reflux line 8; further passing the condensed vapour stream D to the upper part of the second washing column 16 via reflux line 22

(g) withdrawing a second liquid stream E from the first washing column 2 and passing at least a part of said second liquid stream E to the first low pressure separator via recycling line 10;

(h) withdrawing a second liquid stream F from the second washing column 16 and feeding said second liquid stream F at least partially back to the first low pressure separator 1 via connecting line 24.

7. The process of claim 6, whereby the whole second liquid stream E is passed to the first low pressure separator.

8. The process of claim 6, whereby a part of the second liquid stream E is passed to the first low pressure separator and the remaining part of the second liquid stream E is passed to the first washing column via circulation line 9.

9. The process of claim 8, whereby the remaining part of the second liquid stream E which is passed to the washing column is at least partially heated by heater 12.

10. The process according to claim 6, whereby the second liquid stream E passed to the first low pressure separator is heated by wash recycle heater 11.

11. The process according to claim 6, whereby the whole of second liquid stream F is passed to the first low pressure separator.

12. The process according to claim 6, whereby a part of the second liquid stream F is passed to the first low pressure separator and the remaining part of the second liquid stream F is passed to the second washing column via circulation line 23.

13. The process of claim 12, whereby the remaining part of the second liquid stream F which is passed to the second washing column is at least partially heated by heater 25.

14. The process of claim 6, whereby the first liquid stream A from the first low pressure separator 1 is passed into the second low pressure separator 15 as second liquid solution stream.

15. The process according to claim 1, which process further includes providing
    - at least one condenser circulation line 14; and
    - embedded therein a further condenser 13, the condenser circulation line 14 being connected with the recycling solvent vessel 6 or the recycle solvent vessel 20.

16. The process of claim 1, wherein uncondensed material having passed condenser 4 and/or condenser 18 is send back to the polymerization reactor(s) via a feed tank.