CLAIMS

1. A method for separating olefin oligomerization products, the method comprising the following sequence of steps:

a) discharging a reaction mass from an oligomerization reactor;

b) contacting the reaction mass with a catalyst system deactivating agent;

c) isolating a fraction comprising an initial olefin from the reaction mass to form a stream of the fraction comprising an initial olefin and an oligomerization reaction product stream;

d) separating, in an evaporator, of the oligomerization reaction product stream into a fraction predominantly comprising a target α-olefin and a fraction comprising a by-product polymer and the catalyst system residues-,

e) separating the fraction predominantly comprising the target α-olefin obtained in step d) into a light fraction, a fraction of the target α-olefin and a heavy fraction of oligomers.

2. The method according to claim 1, characterized in that ethylene is used as the initial olefin.

3. The method according to any one of claims 1 to 2, characterized in that the oligomerization of the olefin is trimerization of the olefin.

4. The method according to claim 3, characterized in that the trimerization of the olefin is the trimerization of ethylene.

5. The method according to claim 4, characterized in that the fraction predominantly comprising the target α-olefin is C6+ fraction.

6. The method according to claim 4, characterized in that the light fraction is C2-C4 fraction.

7. The method according to claim 4, characterized in that the heavy fraction of oligomers is C8+ fraction.

8. The method according to claim 1, characterized in that the target α-olefin fraction obtained in step e) comprises hexene-1.

9. The method according to claim 1, characterized in that hexene-1 is isolated from the target α-olefin fraction obtained in step e).

10. The method according to claim 1, characterized in that the heavy fraction of oligomers obtained in step e) is directed to the step of isolating the target α-olefin, or to the step of isolating the target α-olefin and to an evaporator.

11. The method according to claim 1, characterized in that the fraction comprising the initial olefin isolated in step c) is fed into the oligomerization reactor.

12. The method according to claim 1, characterized in that the fraction predominantly comprising the target α-olefin isolated in step d) is fed into a separation column.

~~13. The method according to claim 12, characterized in that the fraction predominantly comprising the target α-olefin is separated into a light fraction, a fraction of the target α-olefin and a heavy fraction of oligomers.~~

~~14~~13. The method according to claim 1, characterized in that the evaporator is a thin-film evaporator or a rotary film evaporator.

~~15~~14. The method according to claim ~~14~~13, characterized in that the evaporator is the rotary film evaporator.

~~16~~15. The method according to claim 1, characterized in that the step d) is carried out at a temperature of from 64 to 175ºC.

~~17~~16. The method according to claim ~~16~~15, characterized in that the step d) is carried out at a temperature of from 80 to 150ºC.

~~18~~17. The method according to claim 1, characterized in that the step d) is carried out at a pressure of from 0 to 6 atm gauge.

~~19~~18. The method according to claim ~~18~~17, characterized in that the step d) is carried out at a pressure of from 0 to 3 atm gauge.

~~20~~19. The method according to claim ~~18~~17, characterized in that the step d) is carried out at a pressure of from 0 to 2 atm gauge.

~~21~~20. A method of separating olefin oligomerization products, the method comprising the following sequence of steps:

a) discharging a reaction mass from an oligomerization reactor;

b) contacting the reaction mass with a catalyst system deactivating agent~~-~~;

c) isolating a fraction comprising an initial olefin from the reaction mass to form a stream of the fraction comprising an initial olefin and an oligomerization reaction product stream;

c)* directing a first part of the oligomerization reaction product stream from step c) into a separation column; and directing a second part of the oligomerization reaction product stream from step c) to step d);

d)* separating the first part of the oligomerization reaction product stream from step c)* in the separation column into a light fraction, a fraction of the target α-olefin, and a heavy fraction of oligomers, followed by directing the heavy fraction of oligomers to step d);

d) separating, in ~~the~~ an evaporator, the heavy fraction of oligomers from step d)* and the second part of the oligomerization reaction product stream into a fraction predominantly comprising a target α-olefin, and a fraction comprising a by-product polymer and a catalyst system residues ;

e) separating the fraction predominantly comprising the target α-olefin obtained in step d) and the first part of the oligomerization reaction product stream from step c) into a light fraction, a fraction of the target α-olefin, and a heavy fraction of oligomers.

~~22~~21. The method according to claim ~~21~~20, characterized in that ethylene is used as the initial olefin.

~~23~~22. The method according to claims ~~21~~ 20 or ~~22~~21, characterized in that the oligomerization of the olefin is the trimerization of the olefin.

~~24~~23. The method according to claim ~~23~~22, characterized in that the oligomerization of the olefin is the trimerization of ethylene.

~~25~~24. The method according to claim ~~24~~23, characterized in that the fraction predominantly comprising the target α-olefin is C6+ fraction.

~~26~~25. The method according to claim ~~24~~23, characterized in that the light fraction is C2-C4 fraction.

~~27~~26. The method according to claim ~~24~~23, characterized in that the heavy fraction of oligomers is C8+ fraction.

~~28~~27. The method according to claim ~~21~~20, characterized in that the target α-olefin fraction obtained in step e) comprises hexene-1.

~~29~~28. The method according to claim ~~21~~20, characterized in that hexene-1 is isolated from the target α-olefin fraction obtained in step e).

~~30~~29. The method according to claim ~~21~~20, characterized in that the heavy fraction of oligomers obtained in step e) is directed to the step of isolating the target α-olefin or to the step of isolating the target α-olefin and to an evaporator.

~~31~~30. The method according to claim ~~21~~20, characterized in that the fraction comprising an initial olefin isolated in step c) is returned into the oligomerization reactor.

~~32~~31. The method according to claim ~~21~~20, characterized in that the fraction predominantly comprising the target α-olefin isolated in step d) is fed into a separation column.

~~33. The method according to claim 32, characterized in that the fraction predominantly comprising the target α-olefin is separated into a light fraction, a fraction of the target α-olefin, and a heavy fraction of oligomers.~~

~~34~~32. The method according to claim ~~21~~20, characterized in that the evaporator is a thin-film evaporator or a rotary film evaporator.

~~35~~33. The method according to claim ~~34~~32, characterized in that the evaporator is the rotary film evaporator.

~~36~~34. The method according to claim ~~21~~20, characterized in that the step d)* and step e) are carried out together.

~~37~~35. The method according to claim ~~21~~20, characterized in that the step d) is carried out at a temperature of from 64 to 175ºC.

~~38~~36. The method according to claim ~~21~~20, characterized in that the step d) is carried out at a temperature of from 80 to 150ºC.

~~39~~37. The method according to claim ~~21~~20, characterized in that the step d) is carried out at a pressure of from 0 to 6 atm gauge.

~~40~~38. The method according to claim ~~39~~37, characterized in that the step d) is carried out at a pressure of from 0 to 3 atm gauge.

~~41~~39. The method according to claim ~~39~~37, characterized in that the step d) is carried out at a pressure of from 0 to 2 atm gauge.