CLAIMS

1. A method for producing a cracking product fraction comprising propylene, C4 olefins, or both, the method comprising:

providing a catalytic cracking feedstock comprising:

a hydrocarbon feed comprising, based on the total weight of the hydrocarbon feed, at least 5 wt-% isoparaffins, the sum of the wt-% amounts of isoparaffins and n-paraffins in the hydrocarbon feed being at least 80 wt-%;

subjecting the catalytic cracking feedstock to catalytic cracking in a catalytic cracking reactor at a temperature selected from a range from 300 °C to 450 °C in the presence of a solid catalyst to obtain a cracking product; and

separating from the cracking product at least a fraction comprising propylene, C4 olefins, or both.

2. The method according to claim 1, wherein the catalytic cracking is performed without feeding added molecular hydrogen (H_2) to the catalytic cracking reactor, and/or the catalytic cracking is performed without feeding added steam or added water (H_2O) to the catalytic cracking reactor.

3. The method according to claim 1 or 2, wherein the hydrocarbon feed comprises isoparaffins at least 8 wt-% or at least 10 wt-%, preferably at least 15 wt-%, further preferably at least 20 wt-%, more preferably at least 30 wt-%, even more preferably at least 40 wt-% based on the total weight of the hydrocarbon feed.

4. The method according to any one of the preceding claims, wherein the hydrocarbon feed comprises, based on the total weight of the hydrocarbon feed, at least 50 wt-%, preferably at least 60 wt-%, further preferably at least 70 wt-%, more preferably at least 80 wt-%, and even more preferably at least 90 wt-% hydrocarbons having a carbon number of at least C10.

5. The method according to any one of the preceding claims, wherein the hydrocarbon feed comprises, based on the total weight of the hydrocarbon feed, at most 5 wt-%, preferably at most 3 wt-%, more preferably at most 2 wt-%, even more preferably at most 1 wt-% hydrocarbons having a carbon number of at least C22.

6. The method according to any one of the preceding claims, wherein the sum of the wt-% amounts of isoparaffins and n-paraffins in the hydrocarbon feed is at least 85 wt-%, preferably at least 90 wt-%, more preferably at least 95 wt-%, and even more preferably at least 99 wt-% based on the total weight of the hydrocarbon feed.

7. The method according to any one of the preceding claims, wherein the hydrocarbon feed is a renewable hydrocarbon feed having a biogenic carbon content of at least 90 wt-%, preferably at least 95 wt-%, more preferably about 100 wt-% based on the total weight of carbon in the hydrocarbon feed.

8. The method according to any one of the preceding claims, wherein the catalytic cracking is performed at a pressure selected from a range from 0.01 MPa to 5.0 MPa, preferably from 0.1 MPa to 2 MPa, further preferably from 0.1 MPa to 1 MPa, more preferably from 0.15 MPa to 1 MPa, and even more preferably from 0.20 MPa to 1 MPa.

~~9.~~ The method according to any one of the preceding claims, wherein the catalytic cracking is performed at a temperature selected from a range from 350 °C to 450 °C; or ~~.~~

~~10.~~9. ~~The method according to claim 9, wherein the catalytic cracking is performed~~ at a temperature selected from a range from 370 °C to 450 °C, preferably from 400 °C to 450°C; or at a temperature selected from a range from 350 °C to 430 °C, preferably from 350 °C to 400°C, more preferably from 360 °C to 400 °C.

~~11.~~10. The method according to any one of the preceding claims, wherein the weight hourly space velocity (WHSV, mass flow of the catalytic cracking feedstock/catalyst mass) of the catalytic cracking is selected from a range from 0.01 to 10, preferably from 0.1 g to 5 g catalytic cracking feedstock/g catalyst per hour.

~~12.~~11. The method according to any one of the preceding claims, wherein one or more of temperature, pressure and WHSV, preferably at least temperature and WHSV, are controlled so that the conversion of catalytic cracking feedstock in the catalytic cracking is within a range from 0.20 to 0.85, preferably from 0.20 to 0.80.

~~13.~~12. The method according to any one of the preceding claims, wherein the solid catalyst comprises zeolite or zeolite type material having a micropore size

within a range from 4 to 6 Å, and wherein the solid catalyst preferably has medium strong acidity or strong acidity.

~~14.~~13. The method according to claim 12, wherein the zeolite or zeolite type material comprises ZSM-5, MCM-22, SAPO-34 and/or β zeolite, preferably ZSM-5, MCM-22 and/or SAPO-34.

~~15. The method according to any one of the preceding claims, wherein the catalytic cracking reactor is a fixed bed reactor or a moving solid catalyst reactor, such as a fluidized bed catalytic cracking reactor or a moving bed catalytic cracking reactor.~~

~~16.~~14. The method according to any one of the preceding claims, wherein the hydrocarbon feed is obtained by a process comprising:

hydrotreating renewable oxygen containing hydrocarbons, the renewable oxygen containing hydrocarbons preferably comprising one or more of fatty acids, fatty acid esters, resin acids, resin acid esters, sterols, fatty alcohols, oxygenated terpenes, and other renewable organic acids, ketones, alcohols, and anhydrides, the hydrotreating comprising deoxygenation and isomerisation reactions, to obtain a hydrotreatment product comprising isoparaffins, and

removing vapor phase from the hydrotreatment product to obtain a vapour depleted hydrotreatment product and optionally providing the vapour depleted hydrotreatment product as the hydrocarbon feed.

~~17. The method according to claim 14, comprising recovering from the vapour depleted hydrotreatment product as the hydrocarbon feed a fraction comprising, based on the total weight of the fraction, at least 50 wt-%, preferably at least 60 wt-%, further preferably at least 70 wt-%, more preferably at least 80 wt-%, and even more preferably at least 90 wt-% hydrocarbons having a carbon number of at least C10.~~

~~18.~~15. The method according to any one of the preceding claims, wherein the catalytic cracking feedstock comprises a recycled fraction separated from the cracking product.

~~19.~~16. The method according to any one of the preceding claims, comprising separating from the cracking product a fraction of hydrocarbons having a carbon number of at least C5, preferably at least C10.

~~20.~~17. The method according to claim 1~~6~~9, comprising recycling at least a portion of the fraction of hydrocarbons having a carbon number of at least C5, preferably at least C10, to the catalytic cracking feedstock.

~~21. The method according to any one of the preceding claims, comprising separating from the cracking product a fraction of C5-C9 hydrocarbons.~~

~~22.~~18. The method according to claim 1~~5~~8 or 17~~20~~, wherein the sum of the wt-% amounts of the hydrocarbon feed and the recycled fraction in the catalytic cracking feedstock is at least 90 wt-%, preferably at least 95 wt-%, more preferably at least 99 wt-% based on the total weight of the catalytic cracking feedstock.

~~23.~~19. The method according to any one of the preceding claims, comprising purifying the fraction comprising propylene, or the fraction comprising both propylene and C4 olefins, to obtain purified propylene composition.

~~24.~~20. The method according to any one of the preceding claims, comprising fractionating the fraction comprising C4 olefins, or both propylene and C4 olefins, to obtain one or more of 1-butene, trans-2-butene, cis-2-butene, butadiene, isobutene as fractionated composition(s).