CLAIMS

1. A method comprising:

providing a thermal cracking feed comprising molecular hydrogen (H_2) and from 10 mol-% to 60 mol-% propane based on the total dry amount of substance of the thermal cracking feed, in which thermal cracking feed the ratio of the mol-% amount of propane to the mol-% amount of molecular hydrogen is within a range from 0.10 to 2.5; and

subjecting the thermal cracking feed to thermal cracking to obtain a thermal cracking effluent comprising ethylene.

2. The method according to claim 1, wherein the thermal cracking feed comprises from 15 mol-% to 50 mol-%, preferably from 20 mol-% to 45 mol-%, more preferably from 20 mol-% to 40 mol-%, even more preferably from 20 mol-% to 35 mol-%, such as from 20 mol-% to 30 mol-% propane based on the total dry amount of substance of the thermal cracking feed, and/or the ratio of the mol-% amount of propane to the mol-% amount of molecular hydrogen in the thermal cracking feed is within a range from 0.10 to 2.2, preferably from 0.18 to 2.2, and more preferably from 0.18 to 2.0.

3. The method according to any one of the preceding claims, wherein the ratio of the mol-% amount of hydrocarbons having a carbon number of at least C2 to the mol-% amount of molecular hydrogen in the thermal cracking feed is within a range from 0.10 to 2.5, preferably within a range from 0.10 to 2.2, more preferably within a range from 0.18 to 2.2, even more preferably within a range from 0.18 to 2.0.

4. The method according to any one of the preceding claims, wherein the thermal cracking feed comprises from 1 mol-% to 8 mol-%, preferably from 2 mol-% to 8 mol-% hydrocarbons having a carbon number of at least C4 based on the total dry amount of substance of the thermal cracking feed.

5. The method according to any one of the preceding claims, wherein the thermal cracking feed comprises from 0 mol-% to 10 mol-%, preferably from 0 mol-% to 6 mol-%, more preferably from 0 mol-% to 4 mol-% ethane based on the total dry amount of substance of the thermal cracking feed.

6. The method according to any one of the preceding claims, wherein the thermal cracking feed comprises from 5 mol-% to 80 mol-%, preferably from 10 mol-% to 80 mol-%, more preferably from 20 mol-% to 75 mol-%, even more preferably from 30 mol-% to 70 mol-% molecular hydrogen based on the total dry amount of substance of the thermal cracking feed.

7. The method according to any one of the preceding claims, wherein the sum of the mol-% amounts of methane, CO, CO_2, NH_3 and H_2S in the thermal cracking feed is within a range from 0 mol-% to 15 mol-% or from 0.1 mol-% to 15 mol-%, preferably from 0 mol-% to 10 mol-% or from 0.1 mol-% to 10 mol, more preferably from 0 mol-% to 8 mol-% or from 0.1 mol-% to 8 mol-% based on the total dry amount of substance of the thermal cracking feed.

8. The method according to any one of the preceding claims, wherein the biogenic carbon content of the thermal cracking feed is at least 50 wt-%, preferably at least 70 wt-%, more preferably at least 90 wt-% based on the total weight of carbon (TC) of the thermal cracking feed (EN 16640 (2017)).

9. The method according to any one of the preceding claims, wherein the thermal cracking is steam cracking.

10. The method according to any one of the preceding claims, wherein the thermal cracking is conducted at a coil outlet temperature (COT) within a range from 750 °C to 920 °C, preferably from 780 °C to 890 °C, further preferably from 820 °C to 880 °C, more preferably from 830 °C to 880 °C, even more preferably from 850 °C to 880 °C or/and a coil outlet pressure (COP) within a range from 1.3 bar (absolute) to 6 bar (absolute), preferably from 1.3 bar (absolute) to 3 bar (absolute) or/and a flow rate ratio between thermal cracking diluent, preferably steam, and the thermal cracking feed (flow rate of diluent [kg/h] / flow rate of thermal cracking feed [kg/h]) within a range from 0.1 to 1, preferably from 0.25 to 0.85.

11. The method according to any one of the preceding claims, wherein providing a thermal cracking feed comprises:

subjecting renewable oxygen containing hydrocarbons to hydrotreatment comprising deoxygenation and optionally isomerisation to obtain hydrotreatment effluent, wherein the renewable oxygen containing hydrocarbons preferably comprises 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,

separating gaseous fraction from the hydrotreatment effluent,

and providing the gaseous fraction optionally after having subjected at least a portion of it to purification treatment and optionally mixed with a gaseous fossil co-feed as the thermal cracking feed.

12. The method according to any one of the preceding claims, comprising

separating an ethylene fraction from the thermal cracking effluent,

subjecting the ethylene fraction to polymerisation treatment to produce polymers, optionally after having subjected the ethylene fraction to purification treatment and/or derivatisation, and/or

separating a propylene fraction from the thermal cracking effluent,

subjecting the propylene fraction to polymerisation treatment to produce polymers, optionally after having subjected the propylene fraction to purification treatment and/or derivatisation.

13. A thermal cracking feed comprising molecular hydrogen (H_2) and from 10 mol-% to 60 mol-% propane based on the total dry amount of substance of the thermal cracking feed, in which thermal cracking feed the ratio of the mol-% amount of propane to the mol-% amount of molecular hydrogen is within a range from 0.10 to 2.5 and the ratio of the mol-% amount of hydrocarbons having a carbon number of at least C2 to the mol-% amount of molecular hydrogen is within a range from 0.10 to 2.5.

14. The thermal cracking feed according to claim 13, comprising from 15 mol-% to 50 mol-%, preferably from 20 mol-% to 45 mol-%, more preferably from 20 mol-% to 40 mol-%, even more preferably from 20 mol-% to 35 mol-%, such as from 20 mol-% to 30 mol-% propane based on the total dry amount of substance of the thermal cracking feed, and/or wherein the ratio of the mol-% amount of propane to the mol-% amount of molecular hydrogen is within a range from 0.10 to 2.2, preferably from 0.18 to 2.2, and more preferably from 0.18 to 2.0.

15. The thermal cracking feed according to any one of the preceding claims 13-14, comprising from 1 mol-% to 8 mol-%, preferably from 2 mol-% to 8 mol-% hydrocarbons having a carbon number of at least C4 based on the total dry amount of substance of the thermal cracking feed.

16. The thermal cracking feed according to any one of the preceding claims 13-15, comprising from 0 mol-% to 10 mol-%, preferably from 0 mol-% to 6 mol-%, more preferably from 0 mol-% to 4 mol-% ethane based on the total dry amount of substance of the thermal cracking feed.

17. The thermal cracking feed according to any one of the preceding claims 13-16, comprising from 5 mol-% to 80 mol-%, preferably from 10 mol-% to 80 mol-%, more preferably from 20 mol-% to 75 mol-%, even more preferably from 30 mol-% to 70 mol-% molecular hydrogen based on the total dry amount of substance of the thermal cracking feed, and/or wherein the ratio of the mol-% amount of hydrocarbons having a carbon number of at least C2 to the mol-% amount of molecular hydrogen is within a range from

0.10 to 2.2, preferably within a range from 0.18 to 2.2, more preferably within a range from 0.18 to 2.0.

18. The thermal cracking feed according to any one of the preceding claims 13-17, wherein the sum of the mol-% amounts of methane, CO, CO_2, NH_3 and H_2S in the thermal cracking feed is within a range from 0 mol-% to 15 mol-% or from 0.1 mol-% to 15 mol-%, preferably from 0 mol-% to 10 mol-% or from 0.1 mol-% to 10 mol, more preferably from 0 mol-% to 8 mol-% or from 0.1 mol-% to 8 mol-% based on the total dry amount of substance of the thermal cracking feed.

19. The thermal cracking feed according to any one of the preceding claims 13-18, wherein the biogenic carbon content of the thermal cracking feed is at least 50 wt-%, preferably at least 70 wt-%, more preferably at least 90 wt-% based on the total weight of carbon (TC) of the thermal cracking feed (EN 16640 (2017)).

20. A thermal cracking effluent comprising propylene and least 20 wt-%, preferably at least 25 wt-%, more preferably at least 28 wt-%, even more preferably at least 30 wt-%, such as at least 32 wt-%, ethylene based on the total dry weight of the thermal cracking effluent, in which thermal cracking effluent the ratio of the wt-% amount of propylene to the wt-% amount of ethylene is less than 0.40, preferably less than 0.30, more preferably less than 0.20, such as less than 0.15, and wherein the thermal cracking effluent comprises less than 5.0 wt-%, preferably less than 3.0 wt-%, more preferably less than 2.5 wt-% hydrocarbons having a carbon number of at least C5 based on the total dry weight of the thermal cracking effluent.