CLAIMS:

1. A process for producing C_4^+ hydrocarbons, the process comprising:

(a) in a reforming stage, contacting a gaseous mixture comprising methane and CO_2 with a reforming catalyst to produce a synthesis gas product; and

(b) converting H_2 and CO in the synthesis gas product to hydrocarbons, including the C_4^+ hydrocarbons, provided in a Fischer-Tropsch (FT) product, of an FT reactor, wherein the FT product further comprises unconverted H_2 and CO, in addition to C_1-C_3 hydrocarbons, the process further comprising:

(c) without separating the FT product, feeding the FT product, including the C_4^+ hydrocarbons, unconverted H_2 and CO, and C_1-C_3 hydrocarbons, to a finishing reactor to convert normal C_{20}^+ hydrocarbons in a wax fraction of the FT product to C_4-C_{19} hydrocarbons, wherein no supplemental source of hydrogen is added to the finishing reactor.

2. The process for producing C_4^+ hydrocarbons of claim 1, wherein step (b) is carried out with an FT feed having a substantially same molar H_2:CO ratio as in the synthesis gas product, produced in step (a).

3. The process for producing C_4^+ hydrocarbons of claim 1, wherein, prior to step (b), water is condensed from the synthesis gas product, produced in step (a).

4. The process for producing C_4^+ hydrocarbons of claim 1, wherein at least 75% of the normal C_{20}^+ hydrocarbons in the wax fraction of the FT product are converted in the finishing reactor to normal or branched C_4-C_{19} hydrocarbons, provided in a hydroisomerisation/hydrocracking product of the finishing reactor.

5. The process for producing C_4^+ hydrocarbons of claim 1, wherein the gaseous mixture further comprises H_2O and step (a) is carried out in a CO_2-steam reforming reactor at a temperature from 677°C (1250°F) to 788°C (1450°F), a gauge pressure from 0 kPa (0 psig) to 517 kPa (75 psig), and a weight hourly space velocity (WHSV) from 0.1 hr^{-1} to 2.5 hr^{-1}.

6. The process for producing C_4^+ hydrocarbons of claim 4, wherein the hydroisomerisation/hydrocracking product comprises less than 1 wt-% hydrocarbons that are solid at room temperature.

7. The process for producing C_4^+ hydrocarbons of claim 1, wherein the finishing reactor comprises a dewaxing catalyst having hydroisomerisation and/or hydrocracking activity with respect to normal C_{20}^+ hydrocarbons.

8. The process for producing C_4^+ hydrocarbons of claim 7, wherein the dewaxing catalyst comprises a dewaxing active metal deposited on a solid acidic support.

9. The process for producing C_4^+ hydrocarbons of claim 8, wherein the dewaxing active metal is selected from Group 13 or Group 14 of the Periodic Table.

10. The process for producing C_4^+ hydrocarbons of claim 9, wherein the dewaxing active metal is gallium.

11. The process for producing C_4^+ hydrocarbons of claim 8, wherein the acidic support is a zeolitic or non-zeolitic molecular sieve having at least 15 mmol/gram of acid sites, measured by temperature programmed desorption (TPD) of ammonia.

12. The process for producing C_4^+ hydrocarbons of claim 11, wherein the acidic support is a zeolitic molecular sieve having a silica to alumina molar framework ratio of less than 50.

13. The process for producing C_4^+ hydrocarbons of claim 12, wherein the zeolitic molecular sieve is ZSM-5.

14. The process for producing C_4^+ hydrocarbons of claim 1, wherein the finishing reactor is at a temperature from 232°C (450°F) to 399°C (750°F).

15. The process for producing C_4^+ hydrocarbons of claim 1, wherein at least a portion of the gaseous mixture comprises a hydrocarbon-containing feedstock component selected from the group consisting of a hydropyrolysis gaseous mixture, natural gas comprising CO_2, biogas obtained from bacterial digestion of organic waste, a hydrogen-depleted PSA tail gas, or a gaseous effluent from a bacterial fermentation stage.

16. The process for producing C_4^+ hydrocarbons of claim 9, wherein the metal selected from Group 13 or Group 14 of the Periodic Table is present in an amount from 0.1 wt-% to 3 wt-%, based on the weight of the dewaxing catalyst.

17. The process for producing C_4^+ hydrocarbons of claim 16, wherein the dewaxing catalyst comprises from 0.1 wt-% to 3 wt-% gallium, and the solid acidic support comprises ZSM-5.

18. The process for producing C_4^+ hydrocarbons of claim 1, wherein the finishing reactor is incorporated into the FT reactor.

19. The process for producing C_4^+ hydrocarbons of claim 18, wherein a bed of finishing catalyst is positioned downstream of a bed of FT catalyst, within a single vessel.

20. The process for producing C_4^+ hydrocarbons of claim 1, wherein the FT product is maintained in the vapour phase from an outlet of the FT reactor to an inlet of the finishing reactor.