CLAIMS:

~~1.~~ 1. A process for producing C_4-~~*~~$^+$ hydrocarbons, the process comprising:

~~(a)~~ (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)~~ (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)~~ (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.~~ 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.~~ 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.~~ 4. The process for producing C_4^+ hydrocarbons of claim 1, wherein at least ~~about~~ 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 ~~hydroisomerization~~hydroisomerisation/hydrocracking product of the finishing reactor.

~~5.~~ 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 ~~about~~ 677°C (1250°F~~.~~~~)~~) to ~~about~~ 788°C (1450°F~~.~~~~),~~), a gauge pressure from ~~about~~ 0 kPa (0 psig) to ~~about~~ 517 kPa (75 psig), and a weight hourly space velocity (WHSV) from ~~about~~ 0.1 hr^{-1} to ~~about~~ 2.5 hr^{-1}.

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

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

~~8.~~ 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.~~ 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.~~ 10. The process for producing C_4^+ hydrocarbons of claim 9, wherein the dewaxing active metal is gallium.

~~11.~~ 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 ~~about~~ 15 mmol/gram of acid sites, measured by temperature programmed desorption (TPD) of ammonia.

~~12.~~ 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 ~~about~~ 50.

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

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

~~15.~~ 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.~~ 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 ~~about~~ 0.1 wt-% to ~~about~~ 3 wt-%, based on the weight of the dewaxing catalyst.

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

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

~~19.~~ 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.~~ 20. The process for producing C_4^+ hydrocarbons of claim 1, wherein the FT product is maintained in the ~~vapor~~vapour phase from an outlet of the FT reactor to an inlet of the finishing reactor.