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 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 of claim 1, wherein, prior to step (b), water is condensed from the synthesis gas product, produced in step (a).

4. The process 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/hydrocracking product of the finishing reactor.

5. The process 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. The process of claim 4, wherein the hydroisomerization/hydrocracking product comprises less than about 1 wt-% hydrocarbons that are solid at room temperature.

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

8. The process of claim 7, wherein the dewaxing catalyst comprises a dewaxing active metal deposited on a solid acidic support.

9. The process of claim 8, wherein the dewaxing active metal is selected from Group 13 or Group 14 of the Periodic Table.

10. The process of claim 9, wherein the dewaxing active metal is gallium.

11. The process 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. The process 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. The process of claim 12, wherein the zeolitic molecular sieve is ZSM-5.

14. The process of claim 1, wherein the finishing reactor is at a temperature from about 232° C. (450° F.) to about 399° C. (750° F.).

15. The process 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 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. The process 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. The process of claim 1, wherein the finishing reactor is incorporated into the FT reactor.

19. The process 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 of claim 1, wherein the FT product is maintained in the vapor phase from an outlet of the FT reactor to an inlet of the finishing reactor.