What is claimed is:

1. A process for hydrotreating deoiled asphalt, comprising:

(2) introducing a mixed feedstock (6) obtained by mixing a deoiled asphalt (4) and an aromatics-containing stream (5) into a first reaction unit (7) for hydrogenation reaction, wherein the first reaction unit (7) comprises a mineral-rich precursor material and/or a hydrogenation catalyst; and wherein the composition and the ratio of the deoiled asphalt and the aromatics-containing stream are that the mixed feedstock (6) is in a liquid state at a temperature of not higher than 400 ℃,

(21) separating a liquid phase product from the first reaction unit into a first light component (8) and a first heavy component (9), wherein the first light component and the first heavy component have a cutting point of 240-450 ℃, and wherein the separation is optionally carried out by fractional distillation (19);

(31) introducing the first light component (8) into a second reaction unit (10) for reaction, to provide at least one product selected from the group consisting of a gasoline component (13), a diesel component (14) and a BTX feedstock component (12), wherein the second reaction unit is at least one selected from the group consisting of a hydrocracking unit, a catalytic cracking unit and a diesel hydro-upgrading unit; and

(32) introducing the first heavy component (9) into a delayed coking unit (11) for reaction, to provide at least one product selected from the group consisting of coker gasoline (15), coker diesel (16), coker wax oil (17) and low sulfur petroleum coke (18); or using the first heavy component as a low sulfur ship fuel oil component.

2. The process according to claim 1, wherein in step (2), the deoiled asphalt and the aromatics-containing stream are used in such a ratio that the mixed feedstock formed from the deoiled asphalt and the aromatics-containing stream has a viscosity at 100 ℃ of not more than 400mm^2/s, preferably not more than 200mm^2/s, more preferably not more than 100mm^2/s.

3. The process according to claim 1 or 2, wherein in step (2), the aromatics-containing stream is an aromatics-rich fraction oil and/or aromatic compounds-;

preferably, the aromatics-rich fraction oil has a distillation end point of 200-540 ℃, an aromatic hydrocarbon content of more than or equal to 20 wt%, preferably more than or equal to 40 wt%, and more preferably more than or equal to 50 wt%;

preferably, the aromatics-rich fraction oil is at least one selected from the group consisting of LCO, HCO, ethylene tar, coal tar, coker diesel and coker wax oil.

4. The process according to claim 3, wherein the aromatic compound~~aromatic hydrocarbon~~ is at least one selected from the group consisting of benzene, toluene, xylene, naphthalene, naphthalene substituted with at least one C_{1-6} alkyl group, tricyclic or higher aromatic hydrocarbon.

5. The process according to claim 3, wherein in step (2), the aromatics-containing stream is an aromatics-rich fraction oil, and the deoiled asphalt and the aromatics-containing stream are used at weight ratio of 1:10 to 50:10, preferably 3:10 to 30: 10.

6. The process according to claim 3, wherein in step (2), the aromatics-containing stream is an aromatic hydrocarbon, and the deoiled asphalt and the aromatic hydrocarbon are used at weight ratio of 1:10 to 50:10, preferably 3:10 to 30: 10.

7. The process according to any one of claims 1 to 6, wherein in step (2), the deoiled asphalt is a deoiled asphalt obtained by subjecting a heavy oil feedstock to a solvent deasphalting treatment in a solvent deasphalting unit;

preferably, in the solvent deasphalting unit, the deoiled asphalt is obtained at a yield of not more than 50%, preferably not more than 40%, more preferably not more than 30%, by weight.

8. The process according to any one of claims 1-7, wherein the process further comprises: recycling the coker diesel and/or coker wax oil obtained in step (32) back to step (2) for as at least part of the aromatics-containing stream.

9. The process according to any one of claims 1-7, wherein in step (2), the first reaction unit is operated under conditions of: a reaction temperature of 280-450 ℃, a reaction pressure of 8.0-20.0 MPa, a volume ratio of hydrogen to oil of 400-2000, and a liquid hourly volume space velocity of 0.05-1.2 h^{-1};

preferably, the first reaction unit is operated under conditions of: a reaction temperature of 330-420 ℃, a reaction pressure of 10.0-18.0 MPa, a volume ratio of hydrogen to oil of 600-1200, and a liquid hourly space velocity of 0.10-0.8 h^{-1}.

10. The process according to any one of claims 1-7, wherein in step (31), the second reaction unit is a hydrocracking unit, and the hydrocracking unit is operated under conditions of: a reaction temperature of 330-420 ℃, a reaction pressure of 5.0-18.0 MPa, a volume ratio of hydrogen to oil of 500-2000, and a liquid hourly volume space velocity of 0.3-3.0 h^{-1};

preferably, the hydrocracking unit is loaded with at least one hydrotreating catalyst and at least one hydrocracking catalyst.

11. The process according to any one of claims 1-7, wherein in step (31), the second reaction unit is a catalytic cracking unit, and the catalytic cracking unit is a fluidized catalytic cracking unit;

preferably, the fluidized catalytic cracking unit is operated under conditions of: a reaction temperature of 500-600 ℃, a catalyst-to-oil ratio of 3-12, and a retention time of 1-10 s;

preferably, the fluidized catalytic cracking unit is operated under conditions of: a reaction temperature of 520-580 ℃, a catalyst-to-oil ratio of 4-10, and a retention time of 2-5 s.

12. The process according to any one of claims 1-7, wherein in step (31), the second reaction unit is a diesel hydro-upgrading unit and the diesel hydro-upgrading unit is operated under conditions of: a reaction temperature of 330-420 ℃, a reaction pressure of 5.0-18.0 MPa, a volume ratio of hydrogen to oil of 500-2000, and a liquid hourly volume space velocity of 0.3-3.0 h^{-1};

preferably, the diesel hydro-upgrading unit is loaded with at least one diesel hydro-upgrading catalyst.

13. The process according to any one of claims 1-7, wherein in step (32), the first heavy component is fed into a delayed coking unit for reaction to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax oil, and low sulfur petroleum coke, and the delayed coking unit is operated under conditions of: a reaction temperature of 440-520 ℃, and a retention time of 0.1-4 h;

preferably, in step (32), the first heavy component has a sulfur content of not greater than 1.8 wt%, and the first heavy component is fed into a delayed coking unit for reaction, to provide a low-sulfur petroleum coke, preferably the low-sulfur petroleum coke having a sulfur content of not greater than 3 wt%.

14. The process according to any one of claims 1-7, wherein in step (32), the first heavy component is useful as a low-sulfur ship fuel oil component and the low-sulfur ship fuel oil component has a sulfur content of not greater than 0.5 wt%.

15. The process according to claim 1, wherein the first reaction unit is a fixed bed hydrogenation unit, a moving bed-fixed bed hydrogenation combined unit, or a moving bed hydrogenation unit.

16. The process according to claim 1, wherein,

~~the first reaction unit comprises a mineral-rich precursor material and/or a hydrogenation catalyst,~~ the hydrogenation catalyst can catalyze at least one reaction selected from hydrodemetallization reaction, hydrodesulfurization reaction, hydrodeasphalting reaction and hydrodecarbonization reaction, and the mineral-rich precursor material is a material capable of adsorbing at least one metal selected from V, Ni, Fe, Ca and Mg.

17. The process according to claim 16, wherein in step (2), the mineral-rich precursor material comprises a support and an active component element loaded on the support, the support is at least one selected from the group consisting of aluminum hydroxide, alumina and silica, and the active component element is at least one metal element selected from Group VIB and Group VIII.

18. The process according to claim 16, wherein in step (2), the mineral-rich precursor material has a loss on ignition of not less than 3 wt%, a specific surface area of not less than 80 m^2/g, and a water absorption of not less than 0.9 g/g;

preferably, in step (2), according to the flowing direction of reactants, the first reaction unit is sequentially loaded with a first mineral-rich precursor material and a second mineral-rich precursor material, and the second mineral-rich precursor material has a loss on ignition equal to or greater than that of the first mineral-rich precursor material.

19. A process according to claim 18, wherein in step (2), the first mineral-rich precursor material has a loss on ignition of 3-15wt%, and the second mineral-rich precursor material has a loss on ignition of not less than 15wt%;

preferably, the first mineral-rich precursor material and the second mineral-rich precursor material are loaded at a ratio by volume of from 5:95 to 95: 5.

20. The process according to claim 1, wherein in step (2), the first reaction unit is a moving bed-fixed bed hydrogenation combined unit, and the moving bed is loaded with a mineral-rich precursor material, the fixed bed is sequentially loaded with a mineral-rich precursor material and a hydrogenation catalyst or the fixed bed is loaded with a hydrogenation catalyst;

preferably, the ratio of the volume of the mineral-rich precursor material loaded in the moving bed to the sum of the volumes of the mineral-rich precursor material and the hydrogenation catalyst loaded in the fixed bed is from 10:90 to 60:40, preferably from 20:80 to 40: 60.

21. The process according to claim ~~4~~20, wherein the process further comprises: replacing the mineral-rich precursor material loaded in the moving bed with a fresh mineral-rich precursor material in each period, wherein the replacement proportion

accounts for 5-20 wt%, preferably 10-15 wt%, of the total amount of the mineral-rich precursor material loaded in the moving bed;

preferably, the period is 5-20 days, preferably 10-15 days.

22. The process according to claim 20, wherein the aromatics-containing stream further comprises an aromatics-rich fraction oil, the aromatics-rich fraction oil comprising the LCO and/or the HCO obtained in the DCC unit;

preferably, the aromatics-rich fraction oil has a distillation range of 200-450 ℃, and a content of the aromatic hydrocarbon of more than or equal to 20 wt%, preferably more than or equal to 40 wt%, and more preferably more than or equal to 50 wt%;

preferably, the aromatics-rich fraction oil further comprises at least one selected from ethylene tar, coal tar, coker diesel and coker wax oil.

23. The process according to any one of claims 1-7, further comprising:

(1) Introducing a heavy raw oil into a solvent deasphalting unit for solvent deasphalting treatment, to provide a deoiled asphalt and a deasphalted oil;

(11) Introducing the deasphalted oil into a third hydrogenation unit for hydrogenation reaction, and introducing the liquid phase effluent obtained in the third hydrogenation unit into a DCC unit for reaction, to provide propylene, LCO, HCO and a slurry oil, wherein the third hydrogenation unit is a fixed bed hydrogenation unit~~;~~.

24. The process according to claim 23, wherein in step (11), the operation conditions in the DCC unit are controlled such that the aromatic content of the LCO and/or HCO is more than or equal to 60 wt%.

25. The process according to claim 23, wherein in step (11), the third hydrogenation unit is operated under conditions of: a reaction temperature of 280-400 ℃, a reaction pressure of 6.0-14.0 MPa, a volume ratio of hydrogen to oil of 600-1200, and a liquid hourly space velocity of 0.3-2.0 h^{-1}.

26. The process according to claim 23, wherein in step (11), the third hydrogenation unit is loaded with at least two hydrogenation catalysts;

preferably, the hydrogenation catalyst is a catalyst capable of catalyzing at least one reaction selected from the group consisting of a hydrodemetallization reaction, a hydrodesulfurization reaction, and a hydrodecarbonization reaction;

preferably, the hydrogenation catalyst comprises alumina as the support and a metal element from Group VIB and/or Group VIII as an active component element, and optionally at least one auxiliary element selected from P, Si, F and B.

27. The process according to claim 23, wherein in step (2), the first hydrogenation unit is a fixed bed hydrogenation unit and the first hydrogenation unit is loaded with at least two hydrotreating catalysts;

preferably, the hydrotreating catalyst is a catalyst capable of catalyzing at least one reaction selected from the group consisting of an asphaltene conversion reaction, a hydrodemetallization reaction, a hydrodesulfurization reaction, and a hydrodecarbonization reaction;

preferably, the hydrotreating catalyst comprises alumina as the support and a metal element from Group VIB and/or Group VIII as the active component element, and optionally also comprises at least one auxiliary element selected from P, Si, F and B.

28. The process according to claim 23, wherein in step (2), the first hydrogenation unit is a moving bed hydrogenation unit and the first hydrogenation unit is loaded with at least one moving bed hydrotreating catalyst;

preferably, the moving bed hydrotreating catalyst comprises alumina as the support and a metal element from Group VIB and/or Group VIII as the active component element, and optionally further comprises at least one auxiliary element selected from P, Si, F and B.

29. The process according to claim 23, further comprising:

(13) introducing the slurry oil obtained in the DCC unit into a fourth hydrogenation unit for demetallization reaction, to provide demetallized slurry oil; and

the aromatics-containing stream comprising the slurry obtained in the DCC unit and/or the demetallized slurry obtained in the fourth hydrogenation unit being incorporated into the aromatics-containing stream (5) in step (2) or used as the aromatics-containing stream (5) in step (2).

30. The process according to claim 29, wherein the process further comprises: recycling the coker diesel and/or coker wax oil obtained in step (32) back to step (3) as at least part of the aromatics-containing stream.

31. The process according to claim 29, wherein in step (13), the fourth hydrogenation unit is a fixed bed hydrogenation unit and the fourth hydrogenation unit is operated under conditions of: a reaction temperature of 200-280 ℃, a reaction pressure of 3.0-6.0 MPa, a volume ratio of hydrogen to oil of 600-1200, and a liquid hourly space velocity of 0.5-2.5 h^{-1}.

32. The process according to claim 23, further comprising:

incorporating the LCO and/or HCO obtained in the DCC unit into the aromatics-containing stream (5) in step (2).

33. The process according to claim 32, wherein the process further comprises: circulating the slurry oil obtained in the DCC unit back to the solvent deasphalting unit for solvent deasphalting.

34. The process according to any one of claims 1-7, further comprising:

Step (16): introducing an aromatics-rich fraction oil into a fifth reaction unit for hydrosaturation, followed by fractionation, to provide a second light component and a second heavy component, wherein the second light component and the second heavy component has a cutting point of 100-250 ℃, and the aromatic content in the second heavy component is more than or equal to 20 wt%; and

incorporating the second heavy component into the aromatics-containing stream (5) in step (2).

35. The process according to claim 34, wherein in step (2), the aromatics-containing stream further comprises an aromatic hydrocarbon and/or an aromatic oil, and the aromatic oil is at least one selected from the group consisting of LCO, HCO, FGO, ethylene tar, coal tar, coker diesel, and coker wax oil.

36. The process according to claim 34, wherein the aromatic hydrocarbon content in the aromatics-rich fraction oil is more than or equal to 20 wt%, preferably more than or equal to 25 wt%, and more preferably more than or equal to 40 wt%.

37. The process according to claim 34, wherein in step (16), the fifth reaction unit is at least one of a fixed bed reactor, a moving bed reactor and an boiling bed reactor;

preferably, the fifth reaction unit is operated under conditions of: a reaction temperature of 200-420 ℃, a reaction pressure of 2-18 MPa, a liquid hourly space velocity of 0.3-10 h^{-1}, and a volume ratio of hydrogen to oil of 50-5000;

preferably, the fifth reaction unit is operated under conditions of: a reaction temperature of 220-400 ℃, a reaction pressure of 2-15 MPa, a liquid hourly space velocity of 0.3-5 h^{-1}, and a volume ratio of hydrogen to oil of 50-4000.

38. The process according to claim 34, further comprising:

(1) introducing a heavy raw oil into the solvent deasphalting unit for solvent deasphalting treatment, to provide a deoiled asphalt and a deasphalted oil;

(14) introducing the deasphalted oil into a sixth hydrogenation unit for hydrogenation reaction, and introducing the liquid phase effluent obtained in the sixth hydrogenation unit into a DCC unit for reaction, to provide propylene, LCO, HCO and slurry oil, wherein the sixth hydrogenation unit is a fixed bed hydrogenation unit; and

LCO and/or HCO from the DCC unit being incorporated into the aromatics-rich fraction oil in step (16) or being used as the aromatics-rich fraction oil in step (16).

39. The process according to claim 38, wherein the DCC unit is operated under conditions of: a reaction temperature of 500-650 ℃, a catalyst-to-oil ratio of 3-12, and a retention time of 0.6-6 s.

40. The process according to claim 38, wherein the process further comprises: recycling the coker diesel and/or the coker wax oil obtained in step (32) back to the fifth hydrogenation unit for hydrosaturation.

41. The process according to claim 38, wherein in step (14), the sixth hydrogenation unit is operated under conditions of: a reaction temperature of 280-400 ℃, a reaction pressure of 6.0-14.0 MPa, a volume ratio of hydrogen to oil of 600-1200, and a liquid hourly volume space velocity of 0.3-2.0 h^{-1};

preferably, in step (14), the sixth hydrogenation unit is loaded with at least two hydrogenation catalysts;

preferably, in step (14), the hydrogenation catalyst is a catalyst capable of catalyzing at least one reaction selected from the group consisting of a hydrodemetallization reaction, a hydrodesulfurization reaction, and a hydrodecarbonization reaction;

preferably, in step (14), the hydrogenation catalyst comprises alumina as the support and a metal element from Group VIB and/or Group VIII as the active component element, and the hydrogenation catalyst optionally further comprises at least one auxiliary element selected from P, Si, F and B.

42. A system for hydrotreating a deoiled asphalt, characterized in comprising:

a first reaction unit, which is a fixed bed hydrogenation unit, a moving bed-fixed bed hydrogenation combined unit or a moving bed hydrogenation unit and is used for carrying out hydrogenation reaction of the deoiled asphalt and the aromatics-containing stream therein;

a separation unit in fluid communication with the first reaction unit, for fractionating the liquid phase product from the first reaction unit therein;

a second reaction unit in fluid communication with the separation unit, for reaction therein of the first light component obtained in the separation unit, wherein the second reaction unit is at least one selected from the group consisting of a hydrocracking unit, a catalytic cracking unit, and a diesel hydro-upgrading unit;

a delayed coking unit in fluid communication with the separation unit, for reaction therein of the first heavy component obtained from the separation unit, to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax

oil, and low sulfur petroleum coke.

43. The system according to claim 42, further comprising a solvent deasphalting unit in fluid communication with the first reaction unit, for introducing the deoiled asphalt obtained after the solvent deasphalting treatment of the heavy oil feedstock therein into the first reaction unit.

44. A system for processing heavy raw oil, comprising:

a solvent deasphalting unit, used for subjecting the heavy raw oil to solvent deasphalting treatment therein, to provide deoiled asphalt and deasphalted oil;

a third hydrogenation unit in fluid communication with the solvent deasphalting unit, wherein the third hydrogenation unit is a fixed bed hydrogenation unit for subjecting deasphalted oil from the solvent deasphalting unit to a hydrogenation reaction therein

a DCC unit in fluid communication with the third hydrogenation unit, for reaction therein a liquid phase effluent obtained in the third hydrogenation unit, to provide propylene, LCO, HCO and slurry oil;

a first hydrogenation unit which is either a fixed bed hydrogenation unit or a moving bed hydrogenation unit, wherein the first hydrogenation unit is in fluid communication with the DCC unit and the solvent deasphalting unit, for a conversion reaction therein of the LCO and/or HCO from the DCC unit with the deasphalted pitch from the solvent deasphalting unit;

a separation unit in fluid communication respectively with the first hydrogenation unit and the DCC unit, for fractionating therein a liquid phase effluent from the first hydrogenation unit, which is capable of recycling the first light component obtained in the separation unit back to the DCC unit;

a second reaction unit in fluid communication with the separation unit, for reaction therein of the first light component obtained in the separation unit to provide at least one product selected from the group consisting of a gasoline fraction, a diesel fraction, and a BTX feedstock component;

a delayed coking unit in fluid communication with the separation unit, for reaction therein of the first heavy component obtained from the separation unit, to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax oil, and low sulfur petroleum coke.

45. The system according to any one of claims 42-44, wherein the delayed coking unit is in fluid communication with the first reaction unit for recycling the coker wax oil and/or the coker wax oil obtained in the delayed coking unit back to the first reaction unit.

46. A system for processing heavy raw oil, comprising:

a solvent deasphalting unit, used for subjecting the heavy raw oil to solvent

deasphalting treatment therein, to provide deoiled asphalt and deasphalted oil;

a third hydrogenation unit in fluid communication with the solvent deasphalting unit, wherein the third hydrogenation unit is a fixed bed hydrogenation unit for subjecting deasphalted oil from the solvent deasphalting unit to a hydrogenation reaction therein;

a DCC unit in fluid communication with the third hydrogenation unit, for reaction therein a liquid phase effluent obtained in the third hydrogenation unit, to provide propylene, LCO, HCO and slurry oil;

a fourth hydrogenation unit in fluid communication with the DCC unit, for subjecting the slurry oil obtained in the DCC unit to a demetallization reaction therein, to provide a demetallized slurry;

a first hydrogenation unit which is either a fixed bed hydrogenation unit or a moving bed hydrogenation unit, wherein the first hydrogenation unit is in fluid communication with the DCC unit, the fourth hydrogenation unit, and the solvent deasphalting unit, for a conversion reaction therein of the demetalized slurry oil from the fourth hydrogenation unit and/or the slurry oil from the DCC unit with the deoiled asphalt from the solvent deasphalting unit;

a separation unit in fluid communication respectively with the first hydrogenation unit and the DCC unit, for fractionating therein a liquid phase effluent from the first hydrogenation unit, which is capable of recycling the first light component obtained in the separation unit back to the DCC unit;

a second reaction unit in fluid communication with the separation unit, for reaction therein of the first light component obtained in the separation unit, wherein the second reaction unit is at least one selected from the group consisting of a hydrocracking unit, a catalytic cracking unit, and a diesel hydro-upgrading unit; and

a delayed coking unit in fluid communication with the separation unit, for reaction therein of the first heavy component obtained from the separation unit, to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax oil, and low sulfur petroleum coke.

47. The system according to claim 46, wherein the DCC unit is in fluid communication with the solvent deasphalting unit, for recycling an slurry oil obtained from the DCC unit back to the solvent deasphalting unit for solvent deasphalting.

48. A system for processing an aromatics-rich fraction oil, characterized in comprising:

a fifth reaction unit, for hydrosaturation and fractionation on the aromatics-rich fraction oil to provide a second light component and a second heavy component;

a first reaction unit, which is a fixed bed hydrogenation unit in fluid communication with the fifth reaction unit, for a hydrogenation reaction therein of the deoiled asphalt and the aromatics-containing stream comprising the second heavy component from the fifth

reaction unit;

a separation unit in fluid communication with the first reaction unit, for fractionating therein a liquid phase product from the first reaction unit;

a second reaction unit in fluid communication with the separation unit, for reaction therein of the first light component obtained in the separation unit, wherein the second reaction unit being is at least one selected from the group consisting of a hydrocracking unit, a catalytic cracking unit, and a diesel hydro-upgrading unit; and

a delayed coking unit in fluid communication with the separation unit, for reaction therein of the first heavy component obtained from the separation unit, to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax oil, and low sulfur petroleum coke.

49. The system according to claim 48, wherein the delayed coking unit is in fluid communication with the first reaction unit, for recycling the coker diesel and/or the coker wax oil obtained in the delayed coking unit back to the first reaction unit as at least part of the aromatics-containing stream.

50. The system according to claim 48, further comprising a solvent deasphalting unit, which is in fluid communication with the first reaction unit and is used for solvent deasphalting the heavy oil feedstock therein, and introducing the deoiled asphalt obtained after the solvent deasphalting into the first reaction unit.

51. A system for processing a heavy raw oil and an aromatics-rich fraction oil, characterized in comprising:

a solvent deasphalting unit, used for solvent deasphalting treatment on the heavy raw oil in the solvent deasphalting unit, to provide deoiled asphalt and deasphalted oil;

a sixth hydrogenation unit in fluid communication with the solvent deasphalting unit, wherein the sixth hydrogenation unit is a fixed bed hydrogenation unit, for a hydrogenation reaction therein of the deasphalted oil from the solvent deasphalting unit;

a DCC unit in fluid communication with the sixth hydrogenation unit, for reaction therein a liquid phase effluent obtained in the sixth hydrogenation unit, to provide propylene, LCO, HCO and slurry oil;

a fifth hydrogen unit in fluid communication with the DCC unit, for hydrosaturating and fractionating therein an aromatics-rich fraction oil comprising the LCO and/or the HCO, to provide a second light component and a second heavy component;

a first reaction unit, which is a fixed bed hydrogenation unit in fluid communication respectively with the fifth hydrogenation unit and with the solvent deasphalting unit, for a hydrogenation reaction therein of the deasphalted pitch from the solvent deasphalting unit and an aromatics-containing stream comprising the second heavy component from the fifth hydrogenation unit;

a separation unit in fluid communication respectively with the first reaction unit and with the DCC unit, for fractionating therein a liquid phase product from the first reaction unit, which is capable of recycling the first light component obtained in the separation unit back to the DCC unit;

a second reaction unit in fluid communication with the separation unit, for reaction therein of the first light component obtained in the separation unit, wherein the second reaction unit being is at least one selected from the group consisting of a hydrocracking unit, a catalytic cracking unit, and a diesel hydro-upgrading unit; and

a delayed coking unit in fluid communication with the separation unit, for reaction therein of the first heavy component obtained from the separation unit, to provide at least one product selected from the group consisting of coker gasoline, coker diesel, coker wax oil, and low sulfur petroleum coke.

52. The system according to claim 51, wherein the delayed coking unit is in fluid communication with the first reaction unit, for recycling the coker diesel and/or the coker wax oil obtained in the delayed coking unit back to the fifth hydrogenation unit.