WHAT IS CLAIMED IS:

1. Method of producing a base oil product, the method comprising:

hydroprocessing unconverted oil from a hydrocracker in a separate unconverted oil upgrade reactor to produce upgraded unconverted oil;

dewaxing the upgraded unconverted oil to produce the base oil product;

wherein the unconverted oil from the hydrocracker is derived from hydrocracking a hydrocarbonaceous feedstock;

wherein hydroprocessing the unconverted oil from the hydrocracker to produce upgraded unconverted oil comprises hydrotreating, hydroisomerizing and/or hydrocracking the unconverted oil from the hydrocracker; and

wherein hydroprocessing the unconverted oil from the hydrocracker comprises hydrocracking the unconverted oil from the hydrocracker, and the level of hydrocracking conversion during hydrocracking the unconverted oil from the hydrocracker is less than the level of hydrocracking conversion during hydrocracking the hydrocarbonaceous feedstock in the hydrocracker.

2. The method according to claim 1, further comprising, prior to hydroprocessing the unconverted oil from the hydrocracker:

hydrocracking a hydrocarbonaceous feedstock in the hydrocracker to produce a hydrocracked effluent comprising the unconverted oil; and

separating the unconverted oil from the hydrocracked effluent.

3. The method according to claim 2, wherein the hydrocarbonaceous feedstock has a boiling point in the range from 572 °F to 1112 °F (300 °C to 600 °C) and/or comprises a gas oil such as vacuum gas oil (VGO) or heavy coker gas oil (HCGO).

4. The method according to any preceding claim, wherein hydroprocessing the unconverted oil from the hydrocracker to produce upgraded unconverted oil comprises increasing the viscosity index (VI) of the unconverted oil.

5. The method according to any preceding claim, wherein hydroprocessing the unconverted oil from the hydrocracker to produce upgraded unconverted oil comprises contacting the unconverted oil with a hydroprocessing catalyst in the presence of hydrogen under hydroprocessing conditions.

6. The method according to claim 5, wherein the hydroprocessing catalyst and/or hydroprocessing conditions are selected such that VI-increasing molecular transformations predominate in the hydroprocessing

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7. The method according to claim 5, wherein the hydroprocessing catalyst comprises:

(a) one or more metals selected from Groups VI and VIII to X and/or one or more compounds thereof; and

(b) a catalyst support, and, optionally,

(c) one or more molecular sieves.

8. The method according to claim 5, wherein

the hydroprocessing conditions comprise:

(a) a reaction temperature from 400 °F to 950 °F, corresponding to 204 °C to 510 °C;

(b) a reaction gauge pressure from 500 psi to 5000 psi, corresponding to 3447 kPa to 34474 kPa;

(c) an LHSV from 0.1 hr^{-1} to 15 hr^{-1}; and/or

(d) a hydrogen consumption from 100 scf to 2500 scf per barrel of liquid hydrocarbon feed, corresponding to 17.8 to 445 m^3 H_2/m^3 feed.

9. The method according to claim 1, wherein, prior to hydroprocessing the unconverted oil from the hydrocracker, the unconverted oil comprises one or more of the following:

(a) no greater than 100 ppm of sulfur;

(b) no greater than 20 ppm of nitrogen;

(c) no greater than 1 ppm of nickel, vanadium and/or copper;

(e) an API gravity of from 25 to 45;

(f) a TBP 95% point from 800 °F to 1100 °F (from 427 °C to 593 °C); and

(g) a viscosity index (VI), measured according to ASTM D-2270, of from 100 to 150 at a kinematic viscosity of 4 cSt (4 $mm^2 s^{-1}$) at 100 °C (212 °F).

10. The method according to claim 1, wherein the base oil product has a viscosity index (VI), measured according to ASTM D-2270, of no less than 120 at a kinematic viscosity of 4 cSt (4 $mm^2 s^{-1}$) at 100 °C (212 °F).

11. The method according to claim 1, wherein the base oil product is a Group III base oil product.

12. The method according to claim 1, wherein hydrocracking the unconverted oil from the hydrocracker takes place at a hydrocracking conversion of from 5% to 30%, and wherein hydrocracking the hydrocarbonaceous feedstock in the hydrocracker takes place at a hydrocracking conversion of from 30% to 70%.

13. The method according to claim 7, wherein the catalyst support comprises a porous refractory support.

14. The method according to claim 13, wherein the porous refractory support comprises alumina, silica, amorphous silica-alumina material, or a combination thereof.

15. The method according to claim 8, wherein the hydroprocessing conditions comprise:

(a) a reaction temperature from 650 °F to 850°F, corresponding to 343°C to 454°C;

(b) a reaction gauge pressure from 1500 psi to 2500psi, corresponding to 10342 kPa to 17237 kPa;

(c) an LHSV from 0.2 hr^{-1} to 10 hr^{-1}; and/or

(d) a hydrogen consumption from 200 scf to 2500 scf per barrel of liquid hydrocarbon feed, corresponding to 35.6 to 445 m^3 H_2/m^3 feed.

16. The method according to claim 4, wherein hydroprocessing the unconverted oil from the hydrocracker to produce upgraded unconverted oil increases the viscosity index (VI) of the unconverted oil by 5 to 30.