WHAT IS CLAIMED IS:

1. A hydrocracking process, useful to make middle distillates and unconverted oil, comprising

contacting a hydrocarbon feed with a hydrocracking catalyst under hydrocracking conditions to produce a product comprising middle distillates and unconverted oil;

wherein, the hydrocracking catalyst comprises an SSZ-91 molecular sieve and a modifying metal selected from one or more Group 6 metals, and, optionally, one or more Group 8 to 10 metals, or

a modifying metal selected from Group 8 to 10 metals and combinations thereof, and, optionally, one or more Group 6 metals.

2. The process of claim 1, wherein the sieve comprises both a Group 8 to 10 metal and a Group 6 metal.

3. The process of claim 1, wherein the sieve comprises ZSM-48 type zeolite material, the molecular sieve having:

at least 70% polytype 6 of the total ZSM-48-type material;

an EUO-type phase in an amount of between 0 and 3.5 percent by weight; and

polycrystalline aggregate morphology comprising crystallites having an average aspect ratio of between 1 and 8.

4. The process of claim 1, wherein the Group 8 to 10 metal comprises Ni, Co, or a combination thereof.

5. The process of claim1, wherein the Group 6 metal comprises Mo, W, or a combination thereof.

6. The process of claim 1, wherein the sieve does not comprise a noble metal or wherein the sieve comprises only one or more non-noble metals.

7. The process of claim 1, wherein the silicon oxide to aluminum oxide mole ratio of the sieve is in the range of 40 to 220 or 50 to 220 or 40 to 200.

8. The process of claim 1, wherein the sieve comprises one of more of:

at least 80%, or 90%, polytype 6 of the total ZSM-48-type material;

between 0.1 and 2 wt.% EU-1;

crystallites having an average aspect ratio of between 1 and 5, or between 1 and 3;

or a combination thereof.

9. The process of claim 1, wherein:

the Group 8 to 10 metal comprises Ni, Co, or a combination thereof;

the Group 6 metal comprises Mo, W, or a combination thereof;

or a combination thereof.

10. The process of claim 8, further comprising a matrix material selected from alumina, amorphous silica-alumina (ASA), or a combination thereof.

11. The process of claim 1, further comprising a zeolite selected from Y, USY, beta, or a combination thereof.

12. The process of claim 10, comprising 0.1 to 60 wt.% of the modifying metal, 1 to 99 wt.% of the matrix material, 0.1 to 99 wt.% of the ZSM-type zeolite material, and 0.1 to 99 wt.% of the zeolite selected from Y, USY, beta, or a combination thereof.

13. The process claim 1, wherein the catalyst further comprises a promoter selected from silicon, boron, phosphorus, or a combination thereof.

14. The process of claim 1, wherein the hydrocarbon feed comprises gasoline, kerosene, gas oils, vacuum gas oils, long residues, vacuum residues, atmospheric distillates, heavy fuels, oils, waxes and paraffins, used oils, deasphalted residues or crudes, charges resulting from thermal or catalytic conversion processes, or a combination thereof.

15. The process of claim 1, wherein the middle distillate yield in the 380-700°F range is at least 55, 58, or 60, or 62 wt.%.

16. The process of claim 1, wherein the middle distillate product comprises diesel fuel having a lower cloud and pour point as compared with a diesel product produced using a hydrocracking catalyst that does not include an SSZ-91 molecular sieve.

17. The process of claim 16, wherein the diesel fuel product has one or more of the following characteristics:

the cloud point is lower by at least 5°C, or 10°C, or 15°C, or 20°C;

the cloud point is less than -25°C, or -30°C, or -40°C;

the pour point is lower by at least 2°C, or 4°C, or 6°C;

the pour point is less than -10°C, or -30°C, or -40°C, or -50°C, or -60°C.

18. The process of claim 1, wherein the unconverted oil product comprises unconverted oil having a lower viscosity index and/or a lower viscosity as compared with an unconverted oil product produced using a hydrocracking catalyst that does not include an SSZ-91 molecular sieve.

19. The process of claim 18, wherein the unconverted oil product has one or more of the following characteristics:

the pour point is lower by at least 5°C, or 10°C, or 15°C, or 20°C, or 25°C;

the pour point is less than -35°C, or -40°C, or -45°C, or -50°C, or -55°C; the viscosity index is in the range of 110 to 120;

the viscosity at 100°C is lower by at least 0.1, or 0.2 cSt;

the viscosity at 100°C is in the range of 4.4 to 4.6 cSt;

the viscosity at 70°C is lower by at least 0.1, or 0.2 cSt;

the viscosity at 70°C is in the range of 8.6 to 8.8 cSt.