WHAT IS CLAIMED IS:

1. A hydroisomerization process, useful to make dewaxed products including base oils, the process comprising

contacting a hydrocarbon feed with a hydroisomerization catalyst under hydroisomerization conditions to produce a product;

wherein, the hydroisomerization catalyst comprises an SSZ-91 molecular sieve and at least two different modifying metals selected from Groups 7 to 10 and Group 14 metals of the Periodic Table,

wherein the SSZ-91 molecular 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,

wherein the catalyst comprises Pt as one of the modifying metals in an amount of 0.01-1.0 wt.% and 0.01-1.5 wt.% of the second metal selected from Groups 7 to 10 and Group 14, and

wherein the catalyst further comprises a matrix material selected from alumina, amorphous silica-alumina (ASA), or a combination thereof.

2. The process of claim 1, wherein the second Groups 7 to 10 and Group 14 metal is selected from Pd, Ni, Re, Ru, Ir, and Sn.

3. The process of claims 1 or 2, wherein the modifying metals content is 0.01-5.0 wt.% or 0.01-2.0 wt.%, or 0.1-2.0 wt.%, based on the total catalyst weight.

4. The process of any one of claims 1-3, wherein the catalyst comprises 0.3-0.8 wt.% Pt and 0.05-0.5 wt.% second metal.

5. The process of any one of claims 1-4, wherein the ratio of the first Group 10 metal to the second metal selected from Groups 7 to 10 and Group 14 is in the range of 5:1 to 1:5, or 3:1 to 1:3, or 1:1 to 1:2, or 5:1 to 2:1, or 5:1 to 3:1, or 1:1 to 1:3, or 1:1 to 1:4.

6. The process of any one of claims 1-5, wherein the catalyst comprises Pt as a Group 10 metal in an amount of 0.01-1.0 wt.% or 0.3-0.8 wt.% and a second metal selected from Pd, Ni, Re, Ru, Ir, and Sn as a Groups 7 to 10 and Group 14 metal in an amount of 0.01-1.5 wt.%, or 0.05-0.5 wt.%.

7. The process of any one of claims 1-6, 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 any one of claims 1-7, 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 catalyst comprises 0.01 to 5.0 wt.% of the modifying metal, 1 to 99 wt.% of the matrix material, and 0.1 to 99 wt.% of the SSZ-91 molecular sieve,.

10. The process of any one of claims 1-9, wherein the hydrocarbon feed comprises gas oil; vacuum gas oil; long residue; vacuum residue; atmospheric distillate; heavy fuel; oil; wax and paraffin; used oil; deasphalted residue or crude; charges resulting from thermal or catalytic conversion processes; shale oil; cycle oil; animal and vegetable derived fats, oils and waxes; petroleum and slack wax; or a combination thereof.

11. A hydroisomerization catalyst for use in the process of claim 1, wherein the catalyst comprises 0.01 to 5.0 wt.% of the modifying metal, 1 to 99 wt.% of the matrix material, and 0.1 to 99 wt.% of the SSZ-91 molecular sieve.

12. The process of claim 1, wherein the hydrocarbon feed is a heavy neutral base oil and the catalyst comprises a modifying metal combination selected from Pt/Pd, and Pt/Re.