CLAIMS:

1. A composition of matter comprising:

an inorganic porous crystalline phase material having, after calcination, a hexagonal arrangement of uniformly-sized pores having an average pore diameter of at least about 15 Angstroms to less than about 40 Angstroms and exhibiting a hexagonal diffraction pattern that can be indexed with a d100 value greater than about 18 Angstroms, and

at least one hydrogenation-dehydrogenation component selected from the Group VIII noble metals,

wherein the inorganic porous crystalline phase material contains SiO_2 and XO_2, where X is a Group IV metal, and the inorganic porous crystalline phase material is formed from a synthesis mixture having a ratio of SiO_2 : XO_2 of about 100:1 or less.

2. The composition of matter of claim 2, wherein the Group VIII noble metal is Pt, Pd, Ir, Rh, or a combination thereof.

3. The composition of matter of claim 1, wherein the inorganic porous crystalline phase material has a pore size distribution of plus or minus 25% of an average pore size.

4. The composition of matter of claim 1, wherein X is Ti, Zr, or a combination thereof.

5. The composition of matter of claim 4, wherein the inorganic porous crystalline phase material is MCM-41.

6. The catalyst according to claim 5, wherein the ratio of SiO_2 : XO_2 in the synthesis mixture for forming the MCM-41 support material is from about about 7.5:1 to about 50:1.

7. The catalyst according to claim 5, wherein said catalyst further comprises a binder material selected from active and inactive materials,

inorganic materials, clays, alumina, silica, silica-alumina, titania, zirconia, or a combination thereof.

8. The catalyst according to claim 7, wherein said MCM-41 support material is composited with said binder material.

9. The catalyst according to claim 5, wherein said hydrogenation-dehydrogenation component is present in an amount ranging from about 0.1 to about 2.0 wt.%.

10. An aromatics hydrogenation process for a hydrocarbon feedstream, comprising contacting a hydrocarbon feedstream that contains aromatics with a hydrogenation catalyst according to any of the above claims, in the presence of a hydrogen-containing treat gas in a reaction stage operated under effective aromatics hydrogenation conditions.

11. A process according to claim 10, further comprising contacting a hydrocarbon feedstream containing aromatics, nitrogen and organically bound sulfur contaminants in a first reaction stage operated under effective hydrotreating conditions and in the presence of hydrogen-containing treat gas with a hydrotreating catalyst comprising about at least one Group VIII metal oxide and at least one Group VI metal oxide thereby producing a reaction product comprising at least a vapor product and a liquid hydrocarbon product, the contacting in the first reaction stage being prior to said contacting in the reaction stage operated under effective aromatics hydrogenation conditions.

CLAIMS

1. An aromatics hydrogenation process for a hydrocarbon feedstream, comprising contacting a hydrocarbon feedstream that contains aromatics with an aromatics hydrogenation catalyst, in the presence of a hydrogen-containing treat gas in a first reaction stage operated under effective aromatics hydrogenation conditions including at a temperature of 190°C or less, wherein said aromatics hydrogenation catalyst comprises:
i) an inorganic porous crystalline phase material comprising MCM-41 having, after calcination, a hexagonal arrangement of uniformly-sized pores having diameter of from 15 Å to 25 Å and exhibiting a hexagonal diffraction pattern that can be indexed with a d_{100} value greater than 18 Å; and
ii) at least one hydrogenation-dehydrogenation component selected from Group VIII noble metals, and wherein said inorganic porous crystalline phase material contains SiO_2 and XO_2, where X is a Group IV metal selected from Ti or a combination of Ti and Zr; and said inorganic porous crystalline phase material is formed from a synthesis mixture having a ratio (molar ratio) of SiO_2:XO_2 of 100:1 or less.

2. The process according to claim 1, wherein said Group VIII noble metal is Pt, Pd, Ir, Rh, or a combination thereof.

3. The process according to claim 1, wherein said ratio (molar ratio) of SiO_2:XO_2 in the synthesis mixture for forming said inorganic porous crystalline phase material is from 7.5:1 to 100:1.

4. The process according to claim 1, wherein said aromatics hydrogenation catalyst further comprises a binder material selected from active and inactive materials, inorganic materials, clays, alumina, silica, silica-alumina, titania, zirconia, or a combination thereof.

5. The process according to claim 4, wherein said binder material is selected from alumina silica-alumina, titania or zirconia.

6. The process according to claim 1, wherein said hydrocarbon feedstream is a hydrocarbon fluid, a diesel boiling range feedstream or a lubricating oil boiling range feedstream.

7. The process according to claim 1, wherein said hydrogenation-dehydrogenation component is present in an amount ranging from 0.1 to 2.0 wt %.

8. The process according to claim 1, wherein said hydrogenation-dehydrogenation component is selected from palladium, platinum or a combination thereof.

9. The process according to claim 1, wherein said hydrocarbon feedstream is derived from crude oils, shale oils or tar sands, or synthetic feeds, and is selected from hydrocarbon feedstreams having initial boiling points of 315°C or higher.

10. The process according to claim 9, wherein said hydrocarbon feedstream contains up to 0.2 wt % of nitrogen, up to 3.0 wt % of sulfur and up to 50 wt % of aromatics, based on said hydrocarbon feedstream.

11. The process according to claim 1, wherein said hydrocarbon feedstream contains up to 500 wppm of sulfur.

12. The process according to claim 1, further comprising contacting the hydrocarbon feedstream containing aromatics in a first reaction stage operated under effective catalytic dewaxing conditions and in the presence of hydrogen-containing treat gas with a dewaxing catalyst thereby producing a reaction product, and said contacting in the first reaction stage being carried out prior to said contacting in the reaction stage operated under effective aromatics hydrogenation conditions.