CLAIMS

What is claimed is:

1. A process for producing cyclohexylbenzene, the process comprising:

(a) feeding benzene and hydrogen to at least one reaction zone comprising a catalyst system, said catalyst system comprising a MCM-22 family molecular sieve and at least one hydrogenation metal, said MCM-22 family molecular sieve having an X-ray diffraction pattern including d-spacing maxima at 12.4±0.25, 6.9±0.15, 3.57±0.07 and 3.42±0.07 Angstrom;

(b) selecting hydroalkylation conditions for said at least one reaction zone to produce a hydroalkylation conversion in a range of from ~~about~~ 15% to ~~about~~ 75% wherein said hydroalkylation conditions include a hydroalkylation temperature within the range of from 125°C to 175°C and a hydroalkylation pressure within the range of from 125 psig (862 kPag) to 175 psig (1227 kPag); and

(c) contacting said benzene and said hydrogen in said reaction zone wherein the ratio of the total number of moles of hydrogen fed to the at least one reaction zone to the total number of moles of benzene fed to the at least one reaction zone is from 0.45 to 0.95.

2. The process of claim 1, wherein the selectivity to cyclohexylbenzene is in a range of from 45% to 85%.

3. The process of any preceding claim, wherein said hydroalkylation conditions of temperature is in the range of from 135°C to 165°C.

4. The process of any preceding claim, wherein said hydroalkylation conditions of pressure is in the range of from 931 kPag to 1138 kPa-a.

5. The process of any preceding claim, wherein said hydroalkylation conditions include a weight hourly space velocity in the range of from 0.26 hr^{-1} to less than 1.35 hr^{-1}.

6. The process of claim 1, wherein said MCM-22 family molecular sieve is selected from the group consisting of MCM-22, PSH-3, SSZ-25, ERB-1, ITQ-1, ITQ-2, MCM-36, MCM-49, MCM-56, UZM-8 and combinations of any two or more thereof.

7. The process of claim 1, wherein said at least one hydrogenation metal is selected from the group consisting of palladium, ruthenium, nickel, zinc, tin, cobalt, and combinations of any two or more thereof.

8. The process of any preceding claim, wherein said molecular sieve is MCM-49 and said at least one hydrogenation metal is palladium.