WHAT IS CLAIMED IS:

1. A molecular sieve belonging to the ZSM-48 family of zeolites, wherein the molecular sieve comprises: a silicon oxide to aluminum oxide mole ratio of 50 to 220, at least 70% polytype 6 of the total ZSM-48-type material present in the product, an additional EUO-type molecular sieve phase in an amount of between 0 and 3.5 percent by weight of the total product, and magnesium;
wherein the molecular sieve has a morphology characterized as polycrystalline aggregates comprising crystallites collectively having an average aspect ratio of between 1 and 8.

2. The molecular sieve of claim 1, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.005 to 0.4.

3. The molecular sieve of claim 1, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.01 to 0.25.

4. The molecular sieve of claim 1, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.04 to 0.22.

5. The molecular sieve of claim 1, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.05 to 0.2.

6. The molecular sieve of claim 1, wherein the molecular sieve has a silicon oxide to aluminum oxide mole ratio of 70 to 180.

7. The molecular sieve of claim 1, wherein the molecular sieve is a product of a reaction mixture comprising a molar ratio of SiO_2/Al_2O_3 of from 50 to 220, of M/SiO_2 of from 0.05 to 1.0, of Q/SiO_2 of from 0.01 to 0.1, of OH/SiO_2 of from 0.05 to 0.4, and H_2O/SiO_2 of from 3.0 to 100 wherein M is selected from Groups 1 and 2 of the Periodic Table and Q is a hexamethonium cation.

8. The molecular sieve of claim 1, wherein the molecular sieve is a product of a reaction mixture comprising a molar ratio of SiO_2/Al_2O_3 of from 70 to 180, of M/SiO_2 of from 0.1 to 0.4, of Q/SiO_2 of from 0.015 to 0.05, of OH/SiO_2 of from 0.1 to 0.3, and H_2O/SiO_2 of from 10 to 40 wherein M is selected from Groups 1 and 2 of the Periodic Table and Q is a hexamethonium cation.

9. The molecular sieve of claim 1, which further comprises palladium, platinum, or a mixture thereof.

10. The molecular sieve of claim 1, wherein the molecular sieve has more ammonia desorbing above 440°C than a comparable molecular sieve lacking magnesium in an ammonia temperature programmed desorption test.

11. The molecular sieve of claim 1, wherein the molecular sieve exhibits FTIR vibrational modes at 3670 cm^{-1}, 1010 cm^{-1}, and 660 cm^{-1}.

12. The molecular sieve of claim 1, wherein the molecular sieve exhibits an FTIR vibrational mode at 3670 cm^{-1} before and after exposure to pyridine.

13. A method of preparing the molecular sieve of claim 1, comprising: (a) preparing a reaction mixture containing: at least one source of silicon, at least one source of aluminum, at least one source of an element selected from Groups 1 and 2 of the Periodic Table, at least one source of magnesium, hydroxide ions, hexamethonium cations, and water; and (b) subjecting the reaction mixture to crystallization conditions sufficient to form crystals of the molecular sieve.

14. A process for converting hydrocarbons, comprising contacting a hydrocarbonaceous feed under hydrocarbon converting conditions with a catalyst comprising a molecular sieve, the molecular sieve belonging to the ZSM-48 family of zeolites, wherein the molecular sieve comprises: a silicon oxide to aluminum oxide mole ratio of 50 to 220, at least 70% polytype 6 of the total ZSM-48-type material present in the product, an additional EUO-type molecular sieve phase in an amount of between 0 and 3.5 percent by weight of the total product, and magnesium;
wherein the molecular sieve has a morphology characterized as polycrystalline aggregates comprising crystallites collectively having an average aspect ratio of between 1 and 8.

15. The process of claim 14, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.005 to 0.4.

16. The process of claim 14, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.01 to 0.25.

17. The process of claim 14, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.04 to 0.22.

18. The process of claim 14, wherein the molecular sieve comprises a magnesium oxide to silicon dioxide ratio of from 0.05 to 0.2.

19. The process of claim 14, wherein the molecular sieve has a silicon oxide to aluminum oxide mole ratio of 70 to 180.

20. The process of claim 14, wherein the molecular sieve has more ammonia desorbing above 440°C than a comparable molecular sieve lacking magnesium in an ammonia temperature programmed desorption test and wherein the molecular sieve exhibits FTIR vibrational modes at 3670 cm^{-1}, 1010 cm^{-1} and 660 cm^{-1}.

21. The process of claim 14, wherein the process has at least 1.5% better selectivity at 90% isomerization conversion than a comparable process employing a comparable catalyst that lacks magnesium.

22. A method of preparing molecular sieve SSZ-92, comprising:

(a) preparing a reaction mixture containing:

at least one active source of silicon,

at least one active source of aluminum,

at least one active source of magnesium,

at least one source of an element selected from Groups 1 and 2 of the Periodic Table,

hydroxide ions,

hexamethonium cations, and

water; and

(b) subjecting the reaction mixture to crystallization conditions sufficient to form crystals of the molecular sieve;

wherein the molecular sieve comprises:

a silicon oxide to aluminum oxide mole ratio of 50 to 200,

at least 70% polytype 6 of the total ZSM-48-type material present in the product, and

an additional EUO-type molecular sieve phase in an amount of between 0 and 3.5 percent by weight of the total product; and

wherein the molecular sieve has a morphology characterized as polycrystalline aggregates comprising crystallites collectively having an average aspect ratio of between 1 and 8.

23. The method of Claim 22, wherein the molecular sieve has, in its as-synthesized form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta[(a)]	d-spacing (nm)	Relative Intensity[(b)]
7.50	11.777	w
8.72	10.130	vw
15.06	5.879	vw
18.72	4.736	vw
21.16	4.195	vs
22.86	3.887	vs
24.56	3.622	w
26.14	3.406	vw
28.78	3.100	vw
31.28	2.857	w
34.10	2.627	vw
36.26	2.476	vw
38.04	2.364	vw
38.26	2.351	vw

[(a)] ±0.20

[(b)] The powder XRD patterns provided are based on a relative intensity scale in which the strongest line in the X-ray pattern is assigned a value of 100: vw = very weak (>0 to <10); w = weak (10 to ≤20); m = medium (>20 to ≤40); s = strong (>40 to ≤60); vs = very strong (>60 to ≤100)

24. The method of Claim 22, wherein the molecular sieve is prepared from a reaction mixture comprising, in terms of mole ratios, the following:

SiO_2/Al_2O_3	50 – 220
M/SiO_2	0.05 – 1.0
MgO/SiO_2	0.005 – 0.4
Q/SiO_2	0.01 – 0.2
OH/SiO_2	0.05 – 0.4
H_2O/SiO_2	3 – 100

wherein M is selected from the group consisting of elements from Groups 1 and 2 of the Periodic Table; and Q is a hexamethonium cation.