WHAT IS CLAIMED IS:

1. Molecular sieve SSZ-94, the molecular sieve comprising an MTT-type framework, a mole ratio of from 15 to 100 of silicon oxide to aluminum oxide, a total micropore volume of between 0.02 and 0.05 cc/g, external surface area of between 80 and 120 m^2/g and magnesium, and wherein the zeolite has, in the calcined form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta[(a)] (Degrees)	d-spacing (Angstroms)	Relative Absolute Intensity (%)[(b)]
8.11	10.888	m
8.80	10.045	w
11.32	7.813	m
14.64	6.046	vw
15.85	5.588	vw
16.32	5.427	vw
18.09	4.899	w
19.67	4.510	vs
20.93	4.241	vs
21.61	4.109	m
22.85	3.890	vs
24.04	3.699	vs
24.64	3.610	vs
25.21	3.530	s
25.96	3.430	s
27.03	3.296	w
28.27	3.155	w
29.38	3.037	vw
29.94	2.983	vw
31.59	2.830	w
33.10	2.704	vw
34.03	2.632	vw
35.49	2.527	s
36.51	2.459	w
37.77	2.380	w
38.52	2.335	w

[(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).

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 25-50.

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

8. The molecular sieve of claim 1, wherein the molecular sieve has an external surface area of between 80 and 110 m^2/g.

9. A process for converting hydrocarbons, comprising contacting a hydrocarbonaceous feed under hydrocarbon converting conditions with a molecular sieve SSZ-94 according to any one of claims 1 to 8.

10. The process of claim 9, wherein the process has at least 3% better selectivity at 96% isomerization conversion than a comparable process employing a comparable catalyst comprising SSZ-32 that lacks magnesium.

11. The process of claim 10, wherein the process has at least 6% better selectivity at 96% isomerization conversion.

12. A method of preparing molecular sieve SSZ-94, comprising:

(a) preparing a reaction mixture comprising:

(i) at least one active source of silicon;

(ii) at least one active source of aluminum;

(iii) at least one active source of magnesium;

(iv) at least one active source of an alkali metal;

(v) hydroxide ions;

(vi) an organic templating agent consisting of at least one small, neutral amine capable of forming the zeolite, wherein the small, neutral amine is selected from the group consisting of isobutylamine, diisobutylamine, diisopropylamine, sec-butylamine, 2,5-diemthylpyrrolidone and 2,6-dimethylpiperidine;

(vii) SSZ-32 seed crystals;

wherein the reaction mixture has a composition in terms of mole ratios falling within the ranges below:

SiO_2/Al_2O_3 molar ratio	15 - 100
H_2O/SiO_2 molar ratio	5 - 100
OH^-/SiO_2 molar ratio	0.07 - 1.0
M/SiO_2 molar ratio	0.05 – 0.5
MgO/SiO_2 molar ratio	0.005 - 0.4

Q/SiO_2 molar ratio	0.02 - 0.5

wherein:

M is an alkali metal cation; and

Q is the organic templating agent;

(b) maintaining the reaction mixture under conditions sufficient to form crystals of the zeolite wherein the zeolite is prepared in the absence of an amine component.

(c) recovering the crystals of the zeolite,

13. The method according to claim 12, wherein the zeolite has, in the calcined form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta[(a)] (Degrees)	d-spacing (Angstroms)	Relative Absolute Intensity (%)[(b)]
8.11	10.888	m
8.80	10.045	w
11.32	7.813	m
14.64	6.046	vw
15.85	5.588	vw
16.32	5.427	vw
18.09	4.899	w
19.67	4.510	vs
20.93	4.241	vs
21.61	4.109	m
22.85	3.890	vs
24.04	3.699	vs
24.64	3.610	vs
25.21	3.530	s
25.96	3.430	s
27.03	3.296	w
28.27	3.155	w
29.38	3.037	vw
29.94	2.983	vw
31.59	2.830	w
33.10	2.704	vw
34.03	2.632	vw
35.49	2.527	s
36.51	2.459	w
37.77	2.380	w
38.52	2.335	w

[(a)] $\pm$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).

14. The method of claim 12, wherein:

the H_2O/SiO_2 molar ratio is 15 -20; or

the reaction mixture has a composition in terms of mole ratios falling with the ranges below:

SiO_2/Al_2O_3 molar ratio	20 - 50
H_2O/SiO_2 molar ratio	20 - 50
OH^-/SiO_2 molar ratio	0.15 – 0.3
M/SiO_2 molar ratio	0.075 – 0.3
MgO/SiO_2 molar ratio	0.005 - 0.4
Q/SiO_2 molar ratio	0.1 - 0.3

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15. The method of claim 12, wherein conditions sufficient to form crystals of the zeolite comprises heating the reaction mixture to a temperature of from 140 °C to 170 °C for a suitable period of time to form crystals of the zeolite