CLAIMS:

1. A method of synthesizing a crystalline molecular sieve having an MSE framework type, the method comprising:

forming a reaction mixture comprising a source of water, a source of an oxide of a tetravalent element, Y, selected from at least one of silicon, tin, titanium, vanadium, and germanium, and comprising silicon, a source of a trivalent element, X, comprising aluminum, a source of an alkali or alkaline earth metal, M, comprising potassium but substantially no sodium, a source of a tetraethylammonium cation, Q1, and a source of MSE framework-type seeds in an amount such that a weight ratio of seeds to oxide or tetravalent element , Y, in a said reaction mixture is between about 0.001 and about 0.3,

wherein one or more of the following are satisfied: a total molar ratio of tetraethylammonium cation, Q1, to oxide of tetravalent element, Y, in said reaction mixture is from about 0.01 to about 1; a molar ratio of oxide of tetravalent element, Y, to oxide of trivalent element, X, in general form YO_2/X_2O_3, in said reaction mixture is from about 4 to about 200; a molar ratio of water to oxide of tetravalent element, Y, in said reaction mixture is from about 5 to about 200; and a molar ratio of hydroxyl group concentration to oxide of tetravalent element, Y, in said reaction mixture is from about 0.05 to about 1; a molar ratio of alkali or alkaline earth metal, M, to oxide of tetravalent element, Y, in said reaction mixture is from about 0.05 to about 2; and

crystallizing the reaction mixture at a temperature between about 100°C and about 200°C for up to about 28 days to form the crystalline molecular sieve having an MSE framework type; and

recovering the crystalline molecular sieve formed during crystallization.

2. The method of claim 1, wherein the source of the oxide of trivalent element, X, is additionally selected from one or more of boron, gallium, iron, and chromium.

3. The method of claim 1, wherein one or more of the following are satisfied:

a total molar ratio of tetraethylammonium cation, Q1, to oxide of tetravalent element, Y, in said reaction mixture is from about 0.03 to about 0.7;

a molar ratio of oxide of tetravalent element, Y, to oxide of trivalent element, X, in general form YO_2/X_2O_3, in said reaction mixture is from about 8 to about 120;

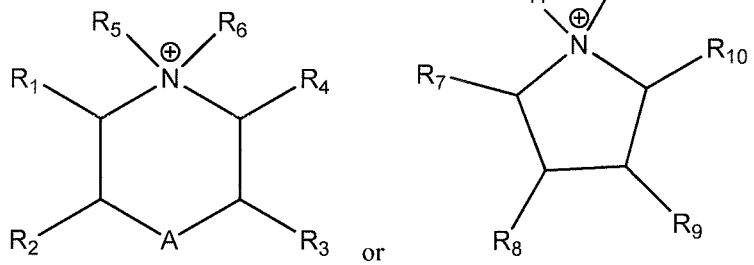
a molar ratio of water to oxide of tetravalent element, Y, in said reaction mixture is from about 10 to about 100;

a molar ratio of hydroxyl group concentration to oxide of tetravalent element, Y, in said reaction mixture is from about 0.6 to about 1.2;

a molar ratio of alkali or alkaline earth metal, M, to oxide of tetravalent element, Y, in said reaction mixture is from about 0.30 to about 1.1; and

seeds of an MSE framework type molecular sieve are present in an amount such that a weight ratio of seeds to oxide of tetravalent element, Y, in said reaction mixture is between about 0.01 and about 0.2.

4. The method of claim 1, wherein the reaction mixture further comprises a source of a second organic cation, Q2, having one or both of the two following general structures:



where A is a $>CR_{13}R_{14}$ group, a >C=O group, an $>NR_{15}$, or an >O group, where R_1, R_2, R_3, R_4, R_7, R_8, R_9, and R_{10} are each independently hydrogen, a hydroxyl group, or a C_1-C_5 hydrocarbon chain, where R_{13} and R_{14} are each independently hydrogen or a C_1-C_5 hydrocarbon chain, where R_5, R_6, R_{11}, and R_{12} are each independently a C_1-C_5 hydrocarbon chain, where R_{15} is a cyclohexyl group, a cyclopentyl group, a phenyl group, a C_1-C_5 alkyl substituted derivative thereof, a C_1-C_5 alkoxy-substituted derivative thereof, or a C_1-C_5 dialkyl substituted derivative thereof, and where one of the R_5 and R_6 groups can alternately be connected to one of the R_{13} and R_{14} groups to form a C_1-C_5 hydrocarbon linking moiety.

5. The method of claim 4, wherein the at least 3 of the R_1-R_4 groups or the R_7-R_{10} groups are hydrogen, and wherein at least one of the R_5 and R_6 groups or at

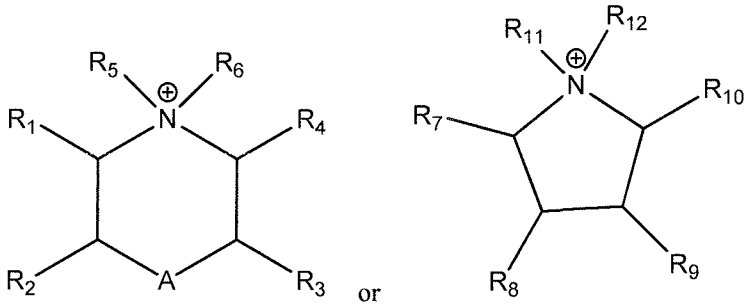
least one of the R_{11} and R_{12} groups is a methyl and/or ethyl group.

6. The method of claim 5, wherein A is an >N-R_{15} group, and where R_{15} is a cyclohexyl group, a phenyl group, or a C_1-C_5 alkyl substituted derivative thereof.

7. The method of claim 6, wherein the tetraethylammonium cation, Q1, and the second organic cation, Q2, are present in the reaction mixture in a molar ratio from about 1:5 to about 99:1.

8. The method of claim 1, wherein the crystalline molecular sieve is MCM-68.

9. A crystalline molecular sieve having an MSE framework type and containing within its pore structure a tetraethylammonium cation, Q1, further containing within its pore structure a second organic cation, Q2, having at least one of the two following general structures:



where A is a >$CR_{13}R_{14}$ group, a >C=O group, an >NR_{15}, or an >O group, where R_1, R_2, R_3, R_4, R_7, R_8, R_9, and R_{10} are each independently hydrogen, a hydroxyl group, or a C_1-C_5 hydrocarbon chain, where R_{13} and R_{14} are each independently hydrogen or a C_1-C_5 hydrocarbon chain, where R_5, R_6, R_{11}, and R_{12} are each independently a C_1-C_5 hydrocarbon chain, where R_{15} is a cyclohexyl group, a cyclopentyl group, a phenyl group, a C_1-C_5 alkyl substituted derivative thereof, a C_1-C_5 alkoxy-substituted derivative thereof, or a C_1-C_5 dialkyl substituted derivative thereof, and where one of the R_5 and R_6 groups can alternately be connected to one of the R_{13} and R_{14} groups to form a C_1-C_5 hydrocarbon linking moiety.

10. The crystalline molecular sieve of claim 9, which is MCM-68.