CLAIMS

1. A crystalline cobalt aluminophosphate molecular sieve having, in its calcined form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta	d-spacing, nm	Relative Intensity
9.60 ± 0.20	0.9208	W
13.62 ± 0.20	0.6498	VS
18.66 ± 0.20	0.4751	VS
20.34 ± 0.20	0.4363	W
21.49 ± 0.20	0.4133	S
23.14 ± 0.20	0.3841	VS
27.29 ± 0.20	0.3265	W
29.28 ± 0.20	0.3047	W
30.42 ± 0.20	0.2936	M
33.18 ± 0.20	0.2698	W
35.01 ± 0.20	0.2561	W.

2. A crystalline cobalt aluminophosphate molecular sieve having, in its as-synthesized form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta	d-spacing, nm	Relative Intensity
9.38 ± 0.20	0.9421	M
13.28 ± 0.20	0.6661	M
18.22 ± 0.20	0.4866	S
21.16 ± 0.20	0.4196	VS
22.66 ± 0.20	0.3921	VS
26.86 ± 0.20	0.3317	W
28.42 ± 0.20	0.3138	W
29.56 ± 0.20	0.3020	W
30.00 ± 0.20	0.2977	W
34.32 ± 0.20	0.2611	M.

3. The molecular sieve of claim 2, having, on an anhydrous basis, a composition represented by the following empirical formula:

$$pQ:aF:(Co_xAl_yP_z)O_2$$

wherein:

(a) p is the number of moles of 1,3-diispropylimidazolium cation (Q) per mole of $(Co_xAl_yP_z)O_2$ and p has a value from 0.001 to 1;

(b) *a* is the number of moles of fluoride ion (F) per mole of $(Co_xAl_yP_z)O_2$ and *a* has a value from 0 to 1;

(c) x, y, and z represent the mole fraction of Co, Al, and P, respectively, as tetrahedral units; and

(d) x, y, and z are each a value greater than zero and less than one and the sum of x, y, and z is one.

4. The molecular sieve of claim 3, wherein x is from 0.01 to 0.5, y is from 0.25 to 0.7, and z is from 0.25 to 0.7.

5. A method of preparing a crystalline cobalt aluminophosphate molecular sieve comprising contacting under crystallization conditions: (1) at least one source of cobalt; (2) at least one source of aluminum; (3) at least one source of phosphorus; (4) fluoride ions; and (5) a 1,3-diisopropylimidazolium ionic liquid.

6. The method of claim 5, wherein the molecular sieve is prepared from a reaction mixture comprising, in terms of mole ratios, as follows:

CoO/Al_2O_3	0.5 to 5
P_2O_5/Al_2O_3	0.5 to 5
Q/Al_2O_3	≥ 5
F/Al_2O_3	0.5 to 3

wherein Q is a 1,3-diisopropylimidazolium cation.

7. The method of claim 5, wherein the molecular sieve is prepared from a reaction mixture comprising, in terms of mole ratios, as follows:

CoO/Al_2O_3	1 to 3
P_2O_5/Al_2O_3	1 to 5
Q/Al_2O_3	5 to 100
F/Al_2O_3	0.5 to 1.5

wherein Q is a 1,3-diisopropylimidazolium cation.

8. The method of claim 5, wherein the molecular sieve has, in its calcined form, an X-ray diffraction pattern substantially as shown in the following Table:

2-Theta	d-spacing, nm	Relative Intensity
9.60 ± 0.20	0.9208	W
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29.28 ± 0.20	0.3047	W
30.42 ± 0.20	0.2936	M
33.18 ± 0.20	0.2698	W
35.01 ± 0.20	0.2561	W.

9. The method of claim 5, wherein the crystallization conditions include a temperature of from 150°C to 200°C.

10. The method of claim 5, wherein the 1,3-diisopropylimidazolium ionic liquid is 1,3-diisopropylimidazolium bromide.

11. The method of claim 5, further comprising recovering the ionic liquid from the reaction mixture.

CLAIMS

1. A crystalline cobalt aluminophosphate molecular sieve having, in its calcined form, an X-ray diffraction pattern as shown in the following Table:

2-Theta	d-spacing, nm	Relative Intensity
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wherein:

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(c) x, y, and z represent the mole fraction of Co, Al, and P, respectively, as tetrahedral units; and

(d) x, y, and z are each a value greater than zero and less than one and the sum of x, y, and z is one.

4. The molecular sieve of claim 3, wherein x is from 0.01 to 0.5, y is from 0.25 to 0.7, and z is from 0.25 to 0.7.

5. A method of preparing the crystalline cobalt aluminophosphate molecular sieve of claim 2, comprising contacting under crystallization conditions: (1) at least one source of cobalt; (2) at least one source of aluminum; (3) at least one source of phosphorus; (4) fluoride ions; and (5) a 1,3-diisopropylimidazolium ionic liquid.

6. The method of claim 5, wherein the molecular sieve is prepared from a reaction mixture comprising, in terms of mole ratios, as follows:

CoO/Al_2O_3	0.5 to 5
P_2O_5/Al_2O_3	0.5 to 5
Q/Al_2O_3	≥ 5
F/Al_2O_3	0.5 to 3

wherein Q is a 1,3-diisopropylimidazolium cation.

7. The method of claim 5, wherein the crystallization conditions include a temperature of from 150°C to 200°C.

8. The method of claim 5, wherein the 1,3-diisopropylimidazolium ionic liquid is 1,3-diisopropylimidazolium bromide.

9. The method of claim 5, further comprising recovering the ionic liquid from the reaction mixture.