CLAIMS

1. A molecular sieve having the structure of ITQ-32 and, in its as-synthesized form, being substantially free of fluoride ions.

2. The molecular sieve of claim 1, which comprises silicon and boron in an atomic ratio (Si/B) greater than 8:1.

3. The molecular sieve of claim 1, wherein the molecular sieve is substantially free of ZSM-12.

4. A molecular sieve having the structure of ITQ-32 and, in its as-synthesized form, being substantially free of fluoride ions and comprising 4,4-dimethyl,1-cyclohexylpiperazinium cations in its pore structure.

5. The molecular sieve of claim 4, which has a composition comprising the molar relationship: $qQ^+:xX_2O_3:SiO_2$, wherein $0 < q \leq 0.06$, $0 \leq x \leq 0.05$, Q^+ comprises a 4,4-dimethyl,1-cyclohexylpiperazinium cation, and X comprises a trivalent element.

6. The molecular sieve of claim 5, wherein the trivalent element X comprises at least one of aluminum, boron, chromium, gallium and iron.

7. The molecular sieve of claim 5, wherein the trivalent element X comprises boron.

8. A process for producing a molecular sieve having the structure of ITQ-32, the process comprising:

(i) preparing a synthesis mixture capable of forming said molecular sieve and comprising water, a source of silica, a source of a trivalent element (X), and a source of 4,4-dimethyl,1-cyclohexylpiperazinium cations (Q^+), the synthesis mixture being substantially free of fluoride ions and having a composition, in terms of molar ratios, within the following amounts:

SiO_2/X_2O_3	about 2 to about 100;
Q^+/SiO_2	about 0.02 to about 1.0; and
H_2O/SiO_2	about 10 to about 60;

(ii) heating the mixture under crystallization conditions comprising a temperature of from about 100ºC to about 200ºC and a time from about 1 day to about 28 days until crystals of the molecular sieve are formed; and

(iii) recovering the molecular sieve from step (ii),

wherein the trivalent element X comprises boron.

9. The process of claim 8, wherein the trivalent element X comprises at least one of aluminum, chromium, gallium and iron.

10. The process of claim 8, wherein the synthesis mixture comprises a source of chloride ions.

11. The process of claim 10, wherein the synthesis mixture exhibits a Cl^-/SiO_2 molar ratio up to about 0.3.

12. The process of claim 8, wherein the synthesis mixture also contains seeds.

13. The process of claim 8, wherein the synthesis mixture comprises from about 0.01 wppm to about 10000 wppm seeds.

14. The process of claim 8, wherein the synthesis mixture comprises from about 100 wppm to about 5000 wppm seeds.

15. The process of claim 14, wherein the seeds comprise a crystalline material having the structure of ITQ-32.

16. The process of claim 8, further comprising removing and/or decomposing at least part of the organic material from the molecular sieve crystals recovered in step (iii).