many processes, including various catalytic reactions. Accordingly, there is a continued need for new methods for making ZSM-12, particularly small crystal forms of this material.

Further, there is a current need to identify molecular sieves that are suitable for catalystic *n*-paraffin isomerization. High-quality lubricating oils are required for the operation of modern machinery and automobiles. Most lubricating oil feedstocks must be dewaxed in order to produce high-quality lubricating oils. Catalytic dewaxing has advantages over solvent extraction of waxes, and the former is a valuable hydrocarbon processing technique. Catalytic dewaxing may be accomplished by cracking and/or isomerization of *n*-paraffins in the feedstocks.

Some prior art catalytic dewaxing processes operate at relatively high temperatures and pressures, resulting in extensive cracking and the production of lower value light gases. Therefore, catalytic dewaxing by isomerization of *n*-paraffins at lower temperatures is desirable. Accordingly, there is a continued need for new catalysts having improved hydrocarbon isomerization selectivity and conversion.

SUMMARY OF THE DISCLOSURE~~INVENTION~~

In accordance with the present disclosure~~invention~~ there is provided an aluminosilicate ZSM-12 molecular sieve having a mole ratio of between 30 and 100 of silicon oxide to aluminum oxide and having, after calcination, the powder X-ray diffraction (XRD) lines of Table 5.

The aluminosilicate ZSM-12 is prepared by contacting under crystallization conditions: (1) at least one source of silicon oxide; (2) at least one source of aluminum oxide; (3) at least one source of an element selected from Groups 1 and 2 of the Periodic Table; (4) hydroxide ions; (5) 1,6-bis(2,3-dimethylimidazolium)hexane cations; and (6) optionally, a second nitrogen-containing structure directing agent suitable for synthesizing ZSM-12.

The aluminosilicate ZSM-12 synthesized per the teachings herein has a composition, as-synthesized and in the anhydrous state, in terms of mole ratios, as follows:

SiO_2 / Al_2O_3	30 - 100
(Q + A) / SiO_2	0.015 - 0.06
M / SiO_2	0 - 0.1

wherein:

(1) M is at least one element selected from Groups 1 and 2 of the Periodic Table;

(2) Q is cationic 1,6-bis(2,3-dimethylimidazolium)hexane, and $Q > 0$; and

(3) A is a second nitrogen-containing structure directing agent, and $A \geq 0$.

According to a further aspect of the present disclosure~~invention~~ there is provided a method of preparing aluminosilicate ZSM-12 by:

(a) preparing a reaction mixture containing: (1) at least one source of silicon oxide; (2) at least one source of boron oxide; (3) at least one source of an element selected from Groups 1 and 2 of the Periodic Table; (4) hydroxide ions; (5) cationic 1,4-bis(trimethylammonium)butane or cationic 1,4-bis(*N*-methylpiperidinium)butane as the structure directing agent; and (6) water;

b) maintaining the reaction mixture under crystallization conditions sufficient to form crystals of borosilicate ZSM-12; and

c) replacing boron in the framework of the borosilicate ZSM-12 with aluminum to provide aluminosilicate ZSM-12.

The present disclosure~~invention~~ also includes a process for converting a hydrocarbonaceous feed by contacting the feed under isomerization conditions with a ZSM-12 molecular sieve having a mole ratio of between 30 and 100 of silicon oxide to aluminum oxide and having, after calcination, the powder XRD lines of Table 5.

In one aspect, there is provided a process for converting a hydrocarbonaceous feed, the process comprising contacting the feed under isomerization conditions with an aluminosilicate ZSM-12 molecular sieve having a mole ratio of between 30 and 100 of silicon oxide to aluminum oxide and having, after calcination, an X-ray diffraction pattern substantially as shown in the following Table:

2 Theta	d-spacing (Angstroms)	Relative Intensity
7.51 ± 0.25	11.76	M
8.86 ± 0.25	9.98	W
14.81 ± 0.25	5.98	W
15.28 ± 0.25	5.80	W
18.75 ± 0.25	4.73	W
19.11 ± 0.25	4.64	W
20.03 ± 0.25	4.43	W
20.91 ± 0.25	4.25	VS
21.98 ± 0.25	4.04	W
22.42 ± 0.25	3.96	W
22.98 ± 0.25	3.88	W
23.24 ± 0.25	3.82	M
25.21 ± 0.25	3.53	W
25.78 ± 0.25	3.45	W
26.33 ± 0.25	3.38	W
26.86 ± 0.25	3.32	W
27.99 ± 0.25	3.19	W
29.33 ± 0.25	3.04	W
30.88 ± 0.25	2.89	W
35.71 ± 0.25	2.51	W
36.97 ± 0.25	2.43	W
38.57 ± 0.25	2.33	W

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a powder XRD pattern of impure ZSM-12 prepared according to Comparative Example 1;

Figure 2 shows a powder XRD pattern of pure aluminosilicate ZSM-12 prepared according to Examples 2 – 4 and 6 of the present invention;

Figure 3 shows powder XRD patterns of borosilicate ZSM-12 prepared according to Examples 7 - 9 of the present invention, in comparison with the pattern for a conventional (standard) sample of aluminosilicate ZSM-12;

Figures 4 and 5 show a scanning electron micrograph of the borosilicate ZSM-12 prepared according to Example 8 of the present invention; and

Figure 6 shows a powder XRD pattern of the aluminosilicate ZSM-12 prepared according to Example 11 of the present invention, in comparison with the pattern for borosilicate ZSM-12.