[0018] SSZ-91 materials are composed of at least 70% polytype 6 of the total ZSM-48-type material present in the product, as determined by DIFFaX simulation and as described by Lobo and Koningsveld in J. Am. Chem. Soc. 2012, 124, 13222-13230, where the disorder was tuned by three distinct fault probabilities. It should be noted the phrase "at least 70%" includes the case where there are no other ZSM-48 polytypes present in the structure, i.e., the material is 100% phase-pure polytype 6.

[0019] In another aspect, SSZ-91 is substantially phase pure. SSZ-91 contains an additional EUO-type molecular sieve phase in an amount of between 0 and 3.5 percent by weight (inclusive) of the total product.

[0020] Molecular sieve SSZ-91 has a morphology characterized as polycrystalline aggregates, each of the aggregates being characterized as being composed of crystallites collectively having an average aspect ratio of between 1 and 8 (inclusive). SSZ-91 exhibits a lower degree of hydrocracking than those ZSM-48 materials having a higher aspect ratio. An aspect ratio of 1 is the ideal lowest value, where the length and width are the same.

[0021] In another aspect, there is provided a method of preparing a crystalline material 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; and (5) hexamethonium cations.

[0022] In yet another aspect, there is provided a process for preparing a crystalline material having, as made, the X-ray diffraction lines of Table 2, by:

(a) preparing a reaction mixture containing (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) hexamethonium cations; and (6) water; and

(b) maintaining the reaction mixture under crystallization conditions sufficient to form crystals of the molecular sieve.

[0022a] In another aspect, there is provided a process for converting hydrocarbons comprising contacting a hydrocarbonaceous feed under hydrocarbon converting conditions with a catalyst comprising a molecular sieve described herein.

[0022b] In yet another aspect, there is provided a use of a molecular sieve described herein for the conversion of hydrocarbons under hydrocarbon converting conditions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] FIG. 1 is a powder X-ray diffraction (XRD) pattern of as-synthesized molecular sieve prepared in Comparative Example 1.

[0024] FIG. 2 is a scanning electron micrograph of as-synthesized molecular sieve prepared in Comparative Example 1.

[0025] FIG. 3 is a scanning electron micrograph of as-synthesized molecular sieve prepared in Comparative Example 2.