Method for Preparing Small Crystal SSZ-32

TECHNICAL FIELD

[001] The invention relates generally to a method of making a catalyst comprising a small crystal intermediate pore size zeolite, specifically SSZ-32.

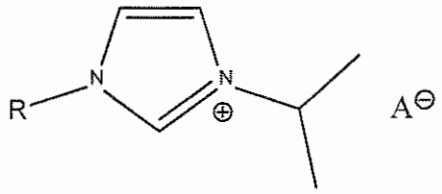
BACKGROUND

[002] Small crystal SSZ-32 (hereinafter referred to as SSZ-32X), in comparison with standard SSZ-32, possesses less defined crystallinity, altered Argon adsorption ratios, increased external surface area and reduced cracking activity over other intermediate pore size molecular sieves used for a variety of catalytic processes. SSZ-32X and methods for making it are disclosed in U.S. Patent Nos. 7,390,763 and 7,569,507. Both methods require the combination of an imidazolium cation and an amine component as templates.

[003] There is a need for improved methods for preparing SSZ-32X.

SUMMARY OF THE ~~INVENTION~~DISCLOSURE

[004] In one aspect, the ~~invention~~disclosure relates to a method for making a small crystal zeolite, comprising preparing a reaction mixture comprising: at least one active source of an oxide of silicon, at least one active source of an oxide of aluminum, at least one active source of an alkali metal, hydroxide ions, and a organic templating agent having the structure:



wherein R is a C_1 to C_5 alkyl group and A^- is an anion which is not detrimental to the crystallization of the zeolite; and maintaining the reaction mixture under conditions sufficient to form crystals of the zeolite wherein the zeolite is prepared in the absence of an amine component.

[004a] In one aspect, there is provided a method of making a small crystal zeolite, comprising

(a) preparing a reaction mixture comprising:

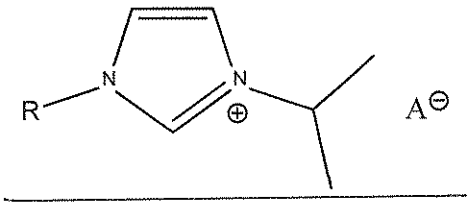
(i) at least one active source of an oxide of silicon;

(ii) at least one active source of an oxide of aluminum;

(iii) at least one active source of an alkali metal;

(iv) hydroxide ions; and

(v) an organic templating agent having the structure:



wherein R is a C_1 to C_5 alkyl group and A^- is an anion which is not detrimental to the crystallization of the zeolite; and

(b) maintaining the reaction mixture under conditions sufficient to form crystals of the zeolite wherein the zeolite is prepared in the absence of an amine component,

wherein the zeolite has a crystallite size of 10 to 40 nanometers.

BRIEF DESCRIPTION OF THE FIGURES

[005] Fig. 1 illustrates changes in apparent viscosity and pH of slurry samples at various shear rates taken from the autoclave during a zeolite synthesis.