the acid treatment may be replaced by another drastic process condition, namely the use of steam. In particular as far as industrial-scale processes are concerned, the use of steam necessarily requires the production of steam, prior to a possible treatment of the boron containing or aluminum containing silicate, which production of steam in turn also requires increased standards of the safety measures.

Therefore, it was an object of the embodiments disclosed herein to provide a process for the preparation of a zeolitic material starting from a boron containing zeolitic material, referred to hereinunder as "B-Zeolite", preferably of structure type MWW (B-MWW), BEA (B-BEA), MFI (B-MFI), CHA (B-CHA), MOR (B-MOR), MTW (B-MTW), RUB (B-RUB), LEV (B-LEV), FER (B-FER), MEL (B-MEL), RTH (B-RTH), more preferably of structure type MWW (B-MWW), wherein for deboronating the B-Zeolite, preferably the B-MWW, B-BEA, B-MFI, B-CHA, B-MOR, B-MTW, B-RUB, B-LEV, B-FER, B-MEL, B-RTH, more preferably the B-MWW, wherein none of the harsh reaction conditions as taught in the prior art is employed, in particular no acid treatment and/or no steam treatment.

It was a further object of embodiments disclosed herein to provide a process for the preparation of a zeolitic material starting from a boron containing zeolitic material, referred to hereinunder as "B-Zeolite", preferably of structure type MWW (B-MWW), BEA (B-BEA), MFI (B-MFI), CHA (B-CHA), MOR (B-MOR), MTW (B-MTW), RUB (B-RUB), LEV (B-LEV), FER (B-FER), MEL (B-MEL), RTH (B-RTH), more preferably of structure type MWW (B-MWW), wherein for deboronating the B-Zeolite, preferably the B-MWW, B-BEA, B-MFI, B-CHA, B-MOR, B-MTW, B-RUB, B-LEV, B-FER, B-MEL, B-RTH, more preferably the B-MWW, wherein the treatment conditions are ecologically and economically advantageous and thus, in particular, suitable for a large-scale industrial production.

Surprisingly, it was found that such deboronation can be accomplished by subjecting a B-Zeolite, preferably a B-MWW, B-BEA, B-MFI, B-CHA, B-MOR, B-MTW, B-RUB, B-LEV, B-FER, B-MEL, B-RTH, more preferably a B-MWW to a solvent system which is liquid, i.e. which is not in the form of steam, and which does not contain the acids as taught in the prior art, which process is highly advantageous from an ecological and economical point of view.

Therefore, the present disclosure relates to a process for the preparation of a zeolitic material, and a zeolitic material obtainable and/or obtained by this process, said process comprising

(i) providing a boron-containing zeolitic material (B-Zeolite), preferably either a boron-containing zeolitic material of structure type MWW (B-MWW) or a boron-containing zeolitic material which is not a boron-containing zeolitic material of structure type MWW (B-MWW), more preferably of structure type MWW (B-MWW), BEA (B-BEA),

MFI (B-MFI), CHA (B-CHA), MOR (B-MOR), MTW (B-MTW), RUB (B-RUB), LEV (B-LEV), FER (B-FER), MEL (B-MEL), or RTH (B-RTH);

(ii) deboronating the B-Zeolite, preferably either the boron-containing zeolitic material of structure type MWW (B-MWW) or the boron-containing zeolitic material which is not a boron-containing zeolitic material of structure type MWW (B-MWW), more preferably the B-MWW, B-BEA, B-MFI, B-CHA, B-MOR, B-MTW, B-RUB, B-LEV, B-FER, B-MEL, B-RTH by treating the B-Zeolite, preferably either the boron-containing zeolitic material of structure type MWW (B-MWW) or the boron-containing zeolitic material which is not a boron-containing zeolitic material of structure type MWW (B-MWW), more preferably the B-MWW, B-BEA, B-MFI, B-CHA, B-MOR, B-MTW, B-RUB, B-LEV, B-FER, B-MEL, B-RTH with a liquid solvent system thereby obtaining a deboronated B-Zeolite, preferably either a deboronated B-MWW (MWW) or a deboronated B-Zeolite (Zeolite) which is not MWW, more preferably a deboronated B-MWW (MWW), B-BEA (BEA), B-MFI (MFI), B-CHA (CHA), B-MOR (MOR), B-MTW (MTW), B-RUB (RUB), B-LEV (LEV), B-FER (FER), B-MEL (MEL), B-RTH (RTH);

wherein the liquid solvent system is selected from the group consisting of water, monohydric alcohols, polyhydric alcohols, and mixtures of two or more thereof, and wherein said liquid solvent system does not contain an inorganic or organic acid or a salt thereof, the acid being selected from the group consisting of hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, formic acid, acetic acid, propionic acid, oxalic acid, and tartaric acid.

In an aspect, there is provided a process for the preparation of a zeolitic material, comprising

(i) providing a boron-containing zeolitic material (B-Zeolite);

(ii) deboronating the B-Zeolite with a liquid solvent system at a temperature in the range of from 50 to 125 °C thereby obtaining a deboronated B-Zeolite (Zeolite);

wherein the boron-containing zeolitic material B-Zeolite provided in (i) is a boron-containing zeolitic material of the structure MWW (B-MWW), wherein the deboronated B-Zeolite (Zeolite) obtained in (ii) is a deboronated B-MWW (MWW); wherein the liquid solvent system is selected from the group consisting of water, monohydric alcohols, polyhydric alcohols, and mixtures of two or more thereof, and wherein said liquid solvent system does not contain an inorganic acid .

In another aspect, there is provided a zeolitic material, obtainable or obtained by a process as defined above.

In another aspect, there is provided a deboronated zeolitic material (Zeolite), containing at most 0.2 weight-% boron, calculated as element and based on the total weight of the Zeolite, wherein the Zeolite has a structure of MWW.

Therefore, the present disclosure more preferably relates to a process for the preparation of a zeolitic material, and a zeolitic material obtainable and/or obtained by this process, said process comprising

(i) providing a boron-containing zeolitic material of structure type MWW (B-MWW);

(ii) deboronating the B-MWW by treating the B-MWW with a liquid solvent system thereby obtaining a deboronated B-MWW (MWW);

wherein the liquid solvent system is selected from the group consisting of water, monohydric alcohols, polyhydric alcohols, and mixtures of two or more thereof, and wherein said liquid solvent system does not contain an inorganic or organic acid or a salt thereof, the acid being selected from the group consisting of hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, formic acid, acetic acid, propionic acid, oxalic acid, and tartaric acid.

Generally, it is conceivable that the process according to the present disclosure can be carried out using a boron-containing zeolitic material or a mixture of two or more boron-containing zeolitic materials having a framework structure type according to the following three-letter codes: ABW, ACO, AEI, AEL, AEN, AET, AFG, AFI, AFN, AFO, AFR, AFS, AFT, AFX, AFY, AHT, ANA, APC, APD, AST, ASV, ATN, ATO, ATS, ATT, ATV, AWO,

Claims

1. A process for the preparation of a zeolitic material, comprising
   (i) providing a boron-containing zeolitic material (B-Zeolite);
   (ii) deboronating the B-Zeolite with a liquid solvent system at a temperature in the range of from 50 to 125 °C thereby obtaining a deboronated B-Zeolite (Zeolite);
   wherein the boron-containing zeolitic material B-Zeolite provided in (i) is a boron-containing zeolitic material of the structure MWW (B-MWW), wherein the deboronated B-Zeolite (Zeolite) obtained in (ii) is a deboronated B-MWW (MWW); wherein the liquid solvent system is selected from the group consisting of water, monohydric alcohols, polyhydric alcohols, and mixtures of two or more thereof, and wherein said liquid solvent system does not contain an inorganic acid .

2. The process of claim, wherein in (i), the boron-containing zeolitic material B-Zeolite is provided by a process comprising
   (a) hydrothermally synthesizing the B-Zeolite from a synthesis mixture containing at least one silicon source, at least one boron source, and at least one template compound, to obtain the B-Zeolite in its mother liquor;
   (b) separating the B-Zeolite from its mother liquor;
   (c) drying the B- Zeolite separated according to (b);
   (d) calcining the B-Zeolite obtained from (b) or (c), preferably at a temperature in the range of from 500 to 700 °C.

3. The process of claim 2, wherein the calcining of step (d) is at a temperature in the range of from 500 to 700 °C.

4. The process of claim 1, wherein in (i), the boron-containing zeolitic material is B-MWW, provided by a process comprising

(a) hydrothermally synthesizing a B-MWW precursor from a synthesis mixture containing ammonia stabilized colloidal silica as at least one silicon source, boric acid as at least one boron source, and at least one template compound selected from the group consisting of piperidine, hexamethylene imine, and a mixture thereof, to obtain the B-MWW precursor in its mother liquor;

(b) separating the B-MWW from its mother liquor;

(c) spray-drying the B-MWW separated according to (b);

(d) calcining the B-MWW precursor obtained from (c) at a temperature in the range of from 500 to 700 °C, obtaining the B-MWW.

5. The process of claim 1, wherein the B-Zeolite provided in (i) is an aluminum-free zeolitic material.

6. The process of claim 1, wherein the B-Zeolite provided in (i) has a B content in the range of from 0.5 to 5.0 weight-%, calculated as element and based on the total weight of the B-Zeolite.

7. The process of claim 1, wherein the B-Zeolite provided in (i) is provided in the form of a spray-powder or a spray-granulate.

8. The process of claim 1, wherein the liquid solvent system does not contain an inorganic or organic acid, or a salt thereof.

9. The process of claim 1, wherein the liquid solvent system is selected from the group consisting of water, methanol, ethanol, propanol, ethane-1,2-diol, propane-1,2-diol, propane-1,3-diol, propane-1,2,3-triol, and mixtures of two or more thereof.

10. The process of claim 1, wherein the liquid solvent system is water.

11. The process of claim 1, wherein the deboronating according to (ii) is carried out for a time in the range of from 6 to 20 h.

12. The process of claim 1, wherein in the deboronating according to (ii), the weight ratio of B-Zeolite relative to the liquid solvent system is in the range of from 1:5 to 1:40.

13. The process of claim 1, wherein during the deboronation according to (ii), the liquid solvent system is stirred.

14. The process of claim 1, wherein the liquid solvent system is water and the deboronating according to (ii) is carried out at a temperature in the range of from 95 to 105 °C, for a time in the range of from 8 to 15 h, wherein the deboronating according to (ii) is carried out under reflux.

15. The process of claim 1, and wherein the Zeolite obtained in (ii) has a B content of at most 0.2 weight-%, calculated as element and based on the total weight of the Zeolite.

16. The process of claim 1, further comprising

(iii) post-treating the Zeolite obtained from (ii) by a process comprising

(iii.1) separating the Zeolite from the liquid solvent system;

(iii.2) drying the separated Zeolite.

17. The process of claim 16, wherein in (iii.2), the separated Zeolite is dried by spray drying.

18. The process of claim 16, further comprising (iii.3) calcining the Zeolite obtained from (iii.2) at temperatures in the range of from 500 to 700 °C.

19. A zeolitic material, obtainable or obtained by a process according to claim 1.

20. A deboronated zeolitic material (Zeolite), containing at most 0.2 weight-% boron,

calculated as element and based on the total weight of the Zeolite, wherein the Zeolite has a structure of MWW.

21. The zeolitic material of claim 20, which zeolitic material is in the form of a spray-powder or a spray-granulate.

22. The zeolitic material according to claim 20, which is a catalytically active agent, a precursor for the preparation of a catalytically active agent, a catalyst component or a component of a washcoat applied on a carrier.