Claims

1. Process for preparing a pulverulent, porous crystalline metal silicate, comprising the following steps:
a) hydrothermal synthesis in an aqueous mixture comprising (A) at least one silicon source, (B) at least one metal source and (C) at least one mineralizer to obtain an aqueous suspension comprising a porous crystalline metal silicate as reaction product; and
b) calcination of the reaction product, wherein
the calcination is conducted by means of flame spray pyrolysis at an adiabatic combustion temperature within a range of 450-2200°C, wherein the suspension having a solids content of ≤ 70% by weight which is obtained in step a) is sprayed into a flame generated by combustion of a fuel in the presence of oxygen to form a pulverulent, porous crystalline metal silicate.

2. Process according to Claim 1, wherein the porous crystalline metal silicate has a zeolite structure.

3. Process according to Claim 2, wherein the porous crystalline metal silicate has a zeolite structure having a crystal structure of the LTA, MFI, FAU, MOR, MEL or MWW type.

4. Process according to Claim 3, wherein the metal source is a source of elements selected from the group consisting of titanium (Ti), aluminium (Al), zirconium (Zr), iron (Fe), tin (Sn), germanium (Ge), indium (In) and boron (B).

5. Process according to any of Claims 1-4, wherein the fuel is selected from the group consisting of hydrogen, methane, ethane, propane, butane, natural gas and mixtures thereof.

6. Process according to any of Claims 1-5, wherein the mean residence time of the suspension obtained in step a) in the conversion thereof in step b) is within a range from 0.1 to 10 s.

7. Process according to any of Claims 1-6, wherein the ignition loss according to DIN 18128:2002-12 of the porous crystalline metal silicate is less than 5% by weight.

8. Process according to any of Claims 1-7, wherein the aqueous mixture in step a) additionally comprises suitable seed crystals.

9. Process according to any of Claims 1-8, wherein the aqueous mixture in step a) additionally comprises a template selected from the group consisting of amines, quaternary ammonium compounds, alcohols and mixtures thereof.

10. Process according to any of Claims 1-9, wherein step a) is conducted at a temperature of 100 to 250°C under the autogenous pressure generated in a pressure-resistant reactor.

11. Process according to any of Claims 1-10, wherein, in step a), component (A) and component (B) are present together in one substance and this substance is selected from the group consisting of amorphous mixed metal-silicon oxide, amorphous silicon dioxide doped with metal oxide, amorphous silicon dioxide impregnated with metal, metal silicate, metal-doped tetraalkyl orthosilicate and mixtures thereof.

12. Process according to Claim 11, wherein component (A) is an amorphous silicon dioxide doped with metal oxide, an amorphous silicon dioxide impregnated with metal, or an amorphous mixed metal-silicon oxide.

13. Process according to any of Claims 1-10, wherein, in step a), component (A) is in solid form and component (B) in liquid form.

14. Process according to Claim 13, wherein component (A) is selected from the group consisting of pyrogenic silicon dioxide, precipitated silicon dioxide, silicon dioxide produced by a sol-gel process and mixtures thereof.

15. Process according to Claim 14, wherein component (A) is a high-purity silicon dioxide prepared by precipitation or a pyrogenic silicon dioxide.

16. Process for preparing a porous crystalline metal silicate in the form of microgranules, spheres, tablets, solid cylinders, hollow cylinders or honeycombs, wherein step b) of a process according to any one of Claims 1 to 15 is followed by a shaping c) comprising the steps of

(1) adding water to obtain an aqueous suspension of the pulverulent, porous crystalline metal silicate,

(2) mixing the suspension from step (1) with granulating aids,

(3) compaction, granulation, spray-drying, spray granulation or extrusion to obtain a porous crystalline metal silicate in the form of microgranules, spheres, tablets, solid cylinders, hollow cylinders or honeycombs.