As suitable zeolitic materials, the zeolites known as TS-1 (titanium silicalite 1), TS-2 (titanium silicalite 2) and TS-3 (titanium silicalite 3) are disclosed. Further, a list of titanium containing molecular sieves having framework structure isomorphous to zeolite beta, mordenite, ZSM-48, ZSM-12, MCM-22 (MWW) and MCM-41 is described. According to these documents, it is especially preferred to employ the catalyst in epoxidation reactions where hydrogen peroxide is generated in situ. Therefore, the main focus of the documents is to be seen in catalysts which additionally contain a noble metal such as palladium. In this respect, reference is made to the working examples where exclusively a modified TS-1 catalyst is employed which was prepared by spray-drying a mixture comprising TS-1, colloidal silica binder and zinc oxide. Palladium as noble metal is then applied to the spray-dried product by ion exchange. This catalyst, i.e. the noble metal-treated spray-dried material, is then employed in an epoxidation reaction where methanol is used as solvent. With regard to the spray-drying step, it is disclosed in the working examples that the air feed temperature of the spray-drier is in the range of from 416 to 437 °C. As to the spray-dried material as such, the only information which is given is the chemical composition comprising 0.35 weight-% zinc.

It was an object of the present disclosure to provide a novel micropowder comprising a zinc and titanium containing zeolitic material of structure type MWW which has advantageous characteristics, in particular when used as intermediate product for the preparation of a catalyst in the form of a molding.

It was another object of the present disclosure to provide a novel molding comprising the novel micropowder, in particular a molding having advantageous properties, preferably if used in epoxidation reactions.

In an aspect, there is provided a moulding comprising a microporous aluminium-free zeolitic material of structure type MWW containing titanium and zinc (ZnTiMWW), wherein the infrared spectrum comprises a band in the region of (3700-3750) ± 20 cm^{-1} and a band in the region of (3670-3690) ± 20 cm^{-1}, and the intensity ratio of the band in the region of (3700-3750) ± 20 cm^{-1} relative to the band in the region of (3670-3690) ± 20 cm^{-1} is at most 1.5,
the moulding preferably further comprising at least one binder, preferably a silica binder.

It was yet another object of the present disclosure to provide a process for the preparation of said micropowder and said molding, in particular to provide a process resulting in a molding having advantageous properties, preferably if used in epoxidation reactions.

In another aspect, there is provided the use of the moulding as defined above as a catalyst, preferably as a catalyst for preparing propylene oxide from propene using hydrogen peroxide as an oxidizing agent in acetonitrile as a solvent.

Surprisingly, it was found that a novel micropowder with particles exhibiting a specific size and pore characteristics represents such advantageous micropowder which is, in particular, a perfectly suitable intermediate for the preparation of a catalyst in the form of a molding.

As to said molding and the preparation thereof, it was found that by a specific post-treatment of a molding prepared based on said intermediate, the characteristics of the molding can be drastically improved, in particular in case the molding is employed as catalyst for the preparation of propylene oxide via epoxidation of propene.

Claims

1. Moulding comprising a microporous aluminium-free zeolitic material of structure type MWW containing titanium and zinc (ZnTiMWW),
wherein the infrared spectrum comprises a band in the region of (3700-3750) ± 20 cm^{-1} and a band in the region of (3670-3690) ± 20 cm^{-1}, and the intensity ratio of the band in the region of (3700-3750) ± 20 cm^{-1} relative to the band in the region of (3670-3690) ± 20 cm^{-1} is at most 1.5,
the moulding preferably further comprising at least one binder, preferably a silica binder.

2. Moulding according to claim 1, comprising mesopores having an average pore diameter in the range of from 4 nm to 40 nm, preferably from 20 nm to 30 nm as determined by Hg porosimetry according to DIN 66133.

3. Moulding according to claim 1 or 2, having a crystallinity, as determined by XRD analysis, of at least (55 +/- 10) %, preferably in the range of from ((55 to 75) +/- 10) %.

4. Moulding according to any one of claims 1 to 3, comprising a micropowder in an amount in the range of from 70 mass% to 80 mass% and the silica binder in an amount in the range of from 30 mass% to 20 mass%, the micropowder together with the silica binder constituting at least 99 mass% of the moulding, wherein the moulding has a concentration of silanol groups with respect to the total number of Si atoms of at most 6 %, preferably at most 3 %, as determined according to ^{29}Si MAS NMR.

5. Moulding according to any one of claims 1 to 4, being a strand having a circular cross-section and a diameter in the range of from 1.5 nm to 1.7 mm and having a crush strength of at least 5 N, preferably in the range of from 5 N to 20 N, more preferably in the range of from 12 N to 20 N, the crush strength being determined by a crush strength test machine Z2.5/TS1S according to the method as described in the specification.

6. Moulding according to any one of claims 1 to 5, the ^{29}Si-NMR spectrum of said moulding comprising six peaks at the following positions
peak 1 at -98 ± x ppm,
peak 2 at -104 ± x ppm,
peak 3 at -110 ± x ppm,
peak 4 at -113 ± x ppm,
peak 5 at -115 ± x ppm,
peak 6 at -118 ± x ppm,
with x in any of the peaks being 1.5, preferably 1.0, more preferably 0.5,

wherein Q, which is defined as:

$$Q = 100 * \{ [a_1+a_2] / [a_4+a_5+a_6] \} / a_3$$

is at most 2.5, preferably at most 1.6, preferably at most 1.4, with $[a_1+a_2]$ being the sum of the peak areas of peaks 1 and 2, $[a_4 + a_5 + a_6]$ being the sum of the peak areas of peaks 4, 5, and 6, and a_3 being the peak area of peak 3.

7. Moulding according to any one of claims 1 to 6, having a water uptake in the range of from 3 mass% to 8 mass%, preferably from 4 mass% to 7 mass%.

8. Moulding according to any one of claims 1 to 6, wherein the infrared spectrum comprises a band in the region of (3700 - 3750) ± 20 cm^{-1} and a band in the region of (3670 - 3690) ± 20 cm^{-1}, and the intensity ratio of the band in the region of (3700 - 3750) ±- 20 cm^{-1} relative to the band in the region of (3670 - 3690) ± 20 cm^{-1} is at most 1.4.

9. Moulding according to any one of claims 1 to 8 for use as a catalyst, preferably for use as catalyst for preparing propylene oxide from propene using hydrogen peroxide as an oxidizing agent in acetonitrile as a solvent in a continuous process, wherein the selectivity with respect to propylene oxide relative to hydrogen peroxide after a run-time of 500 hours is at least 95 %, preferably at least 96 %.

10. Use of the moulding according to any one of claims 1 to 8 as a catalyst, preferably as a catalyst for preparing propylene oxide from propene using hydrogen peroxide as an oxidizing agent in acetonitrile as a solvent.