even at elevated application temperatures.

Summary

In one aspect, the present invention is directed to a powdered catalyst material on titanium oxide basis, having a combined content of at least 90% by weight hydrated titanium oxide with having general formula $TiO_{(2-x)}(OH)_{2x}$ with $0 < x \leq 1$, particularly $0.1 < x \leq 1$ (calculated as TiO_2) and silicon dioxide including hydrated precursors thereof (calculated as SiO_2), which has a specific surface area of > 300 m^2/g and an isoelectric point in the range from 4.0 - 7.0, wherein the TiO_2/SiO_2 weight ratio, determined respectively for TiO_2 and SiO_2 is at least 3, preferably at least 5, and less than 30, preferably less than 25, and the percentages by weight are relative to the total weight of the catalyst material after it has been dried at 105 °C for at least 2 hours. In another aspect, the present invention is directed to a Process for preparing the powdered catalyst material on titanium oxide basis according to the present invention, in which: a. an aqueouse suspension of titanium oxide hydrate particles having general formula $TiO_{(2-x)}(OH)_{2x}$ with $0 < x \leq 1$, particularly $0.1 < x \leq 1$, preferably with average particle sizes from 20 – 500 nm is reacted iwth an Si-containing compound while stirring vigorously, wherein the pH value can be maintained in the range from pH = 3 to 9, particularly 4 to 7 by the optional addition of an acid or alkaline solution, b. optionally the pH value is adjusted if necessary to the range between 4 and 7, c. the suspension obtained is filtered off, and d. the filter cake obtained is washed with water until the filtrate has a conductivity not more than 500 µS/cm. In still another aspect, the present invention refers to the use of the powdered catalyst material according to the present invention for preparing shaped bodies, particularly for catalytic application or as a support for catalytically active metals for application in the field of catalysis such as photocatalysis, Claus catalysis, Claus-Tail-Gas-Behandlung, SCR, Hydrotreating, Gas-to-Liquid-Process, Fischer-Tropsch-Process. In yet another aspect, the present invention refers to shaped bodies on a titanium oxide basis with content of powdered catalyst material according to the present invention with a specific surface area of > 80 m^2/g, particularly > 100 m^2/g, preferably > 120 m^2/g, particularly preferably > 150 m^2/g, most particularly preferably > 200 m^2/g.

Detailed Description

The inventor has now discovered that the inorganically post-processed, powdered titanium oxide according to the invention has significantly enhanced catalytic properties as well as good thermal stability, thus overcoming the disadvantages of the prior art.

The inorganically post-processed, powdered titanium oxide as the inventive product is characterised particularly by the following properties:

- a combined content of at least 90% by weight hydrated titanium oxide having general formula $TiO_{(2-x)}(OH)_{2x}$ wherein $0 < x \leq 1$, particularly $0.1 < x \leq 1$, (calculated as TiO_2) and silicon dioxide including hydrated precursor forms thereof (calculated as SiO_2), wherein the TiO_2/SiO_2 weight ratio, in which TiO_2 and SiO_2 are each determined as described in the method, is at least 3, preferably at least 5, and less than 30, preferably less than 25, and the % by weight is relative to the total weight of the catalyst material after it has been dried at 105 °C for at least 2 hours; wherein the remainder to 100% by weight consists of chemically bound water and traces of by-elements as explained below;
- the specific surface area of the dried product is > 300 m^2/g, particularly preferably > 350 cm^2/g;
- the isoelectric point is in the pH range from: 4.0 – 7.0, preferably 4.5 – 5.9, particularly preferably 4.7 – 5.9;

When the material is dried at 105 °C for at least 2 hours, the directly prepared inorganically post-processed, powdered titanium oxide as the product according to the invention undergoes a loss of weight of up to 10%, wherein most of the weight loss is accounted for by water. Besides the water that is then still chemically bound in the inorganically post-processed, powdered titanium oxide which has been dried as before, which can account for up to 7% by weight of the product dried at 105 °C and can only be driven off at higher temperatures from about 200 to 800 °C, traces of by-elements such as Na, K, Ca, Mg, Cl, sulphates, nitrates, Nb, Zr, Fe, Cr, V, Li, Al may be contained as constituents of the product in a combined total amount not exceeding 3%. Thus, the total content of TiO_2 plus SiO_2 in the

11. Shaped bodies on a titanium oxide basis with content of powdered catalyst material according to any one of claims 1 to 6 with a specific surface area of > 80 m^2/g, particularly > 100 m^2/g, preferably > 120 m^2/g, particularly preferably > 150 m^2/g, most particularly preferably > 200 m^2/g.

12. Shaped bodies according to claim 11 with a pore volume (N_2, Total) of more than 0.2 cm^3/g, preferably more than 0,3 cm^3/g, particularly more than 0,5 cm^3/g, more preferably more than 0,55 cm^3/g, most particularly preferably more than 0,6 cm^3/g.

13. Shaped bodies according to claim 11 or 12 with a specific total surface area per volume of more than 100 000 m^2/l, preferably more than 120 000 m^2/l.

14. Use of the titanium oxide-containing shaped bodies according to any one of claims 11 to 13 as a catalyst or support for catalytically active metals for for application in the field of catalysis such as photocatalysis, Claus catalysis, Claus-Tail-Gas-Behandlung, SCR, Hydrotreating, Gas-to-Liquid-Process, Fischer-Tropsch-Process.

15. Titanium oxide-containing shaped bodies according to any one of claims 11 to 13, having a content of 10 – 35 % by weight Mo, 0 to 6 % by weight Co and/or Ni, calculated as metal oxide (MoO_3, CoO and NiO), and the rest up to 100% by weight of titanium oxide with the general formula $TiO_{(2-x)}(OH)_{2x}$ wherein $0 < x \leq 1$, particularly $0.1 < x \leq 1$ and SiO_2, and which have a specific surface area of at least 80m^2/g, particularly at least 100 m^2/g and a pore volume of more than 0,25 cm^3/g preferably more than 0,27 cm^3/g, wherein the percentages by weight are relative to the total weight of the charged titanium oxide-containing shaped bodies.

16. Titanium oxide-containing shaped bodies according to claim 15 wherein the MoO_3 content is 18 – 30 % by weight.