[0005]

In Patent Document 2, in order to obtain a sintered body having a color suitable for a dental prosthesis, it has been studied to immerse a porous calcined body in a coloring solution containing iron ions and then sinter the resulting calcined body.

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0006]

Patent Document 1: U.S. Patent No. 9,428,422

Patent Document 2: European Patent Application Publication No. 3892254

SUMMARY

[0006a]

In an aspect of the present disclosure, there is provided a powder of zirconia, comprising a stabilizing element and a transition metal element that can color zirconia, wherein in a frequency distribution of element ratios of the transition metal element that can color zirconia/zirconium plotted at intervals of 0.005, a difference between a minimum value and a maximum value of the transition metal element that can color zirconia/zirconium is less than 0.25, wherein the powder has a bulk density of 1.10 g/cm^3 or more and 1.40 g/cm^3 or less, and wherein when a disk-shaped green body obtained by filling 3.0 g of the powder into a mold having a diameter of 25 mm, performing uniaxial pressing at a pressure of 49 MPa and then performing CIP treatment at a pressure of 196 MPa is calcined under the following conditions to provide a calcined body, a shrinkage percentage determined from the following formula is less than 4.0%:

calcination temperature: 1,000°C,

calcination time: 1 hour,

rate of temperature increase: 50 °C/hour,

calcination atmosphere: air atmosphere,

rate of temperature decrease: 300 °C/hour and

shrinkage percentage [%] = {(25 - diameter of calcined body) [mm]/25 [mm]} × 100 … (1).

[0006b]

In a further aspect of the present disclosure, there is provided a green body, comprising the powder as disclosed herein.

[0006c]

In another aspect of the present disclosure, there is provided a method for

producing a calcined body, comprising a step of calcining the green body as disclosed herein.

[0006d]

In a further aspect of the present disclosure, there is provided a method for producing a sintered body, comprising a step of sintering at least one of a green body containing the powder as disclosed herein and a calcined body obtained by calcining the green body.

DISCLOSURE OF INVENTION

TECHNICAL PROBLEM

[0007]

In a method disclosed in Patent Document 2, gradual impregnation with a coloring component is performed from the surface to the inside. For this reason, the concentration of the coloring component is high on the surface of the calcined body and low in the inside, and the coloring component is contained in the calcined body with a concentration gradient from the surface to the inside. Thus, the resulting sintered body is likely to have a difference in color tone between the surface and the inside. In addition, when a calcined body that has already been processed is reprocessed, the color tone of the resulting sintered body may be visually recognized as being different from the color tone before reprocessing. In contrast, the method disclosed in Patent Document 1 makes it possible to obtain a calcined body and a sintered body in which the coloring component is contained almost uniformly from the surface to the inside of the calcined body. Therefore, the calcined body obtained from the powder of Patent Document 1 is suitable for calcined body processing. In addition, a change in color tone before and after reprocessing is small, compared with the calcined body obtained from Patent Document 2. Recent improvements in processing technology have led to finer processing. As a result, there is a demand for a calcined body having more

CLAIMS

1. A powder of zirconia, comprising a stabilizing element and a transition metal element that can color zirconia, wherein in a frequency distribution of element ratios of the transition metal element that can color zirconia/zirconium plotted at intervals of 0.005, a difference between a minimum value and a maximum value of the transition metal element that can color zirconia/zirconium is less than 0.25, wherein the powder has a bulk density of 1.10 g/cm^3 or more and 1.40 g/cm^3 or less, and wherein when a disk-shaped green body obtained by filling 3.0 g of the powder into a mold having a diameter of 25 mm, performing uniaxial pressing at a pressure of 49 MPa and then performing CIP treatment at a pressure of 196 MPa is calcined under the following conditions to provide a calcined body, a shrinkage percentage determined from the following formula is less than 4.0%:

calcination temperature: 1,000°C,

calcination time: 1 hour,

rate of temperature increase: 50 °C/hour,

calcination atmosphere: air atmosphere,

rate of temperature decrease: 300 °C/hour and

shrinkage percentage [%] = {(25 - diameter of calcined body) [mm]/25 [mm]} × 100 … (1).

2. The powder according to claim 1, wherein a total frequency of the transition metal element that can color zirconia/zirconium of less than 0.005 in the frequency distribution is 6.5% or less.

3. The powder according to claim 1 or 2, wherein a total frequency of the transition metal element that can color zirconia/zirconium of 0.05 or more in the frequency distribution is 2.5% or less.

4. The powder according to claim 1 or 2, wherein the transition metal element that can color zirconia is one or more selected from the group consisting of titanium (Ti), chromium (Cr), manganese (Mn), iron (Fe), cobalt (Co), nickel (Ni), copper (Cu), niobium (Nb), vanadium (V), molybdenum (Mo), technetium (Tc), ruthenium (Ru), rhodium (Rh), palladium (Pd) and silver (Ag).

5. The powder according to claim 1 or 2, wherein the stabilizing element is one or more selected from the group consisting of yttrium (Y), calcium (Ca), magnesium (Mg), terbium (Tb) and erbium (Er).

6. The powder according to claim 1 or 2, wherein the powder contains one or more selected from the group consisting of alumina (Al_2O_3), silica (SiO_2) and germania (GeO_2).

7. The powder according to claim 1 or 2, wherein the powder has a BET specific surface area of 8 m^2/g or more and 15 m^2/g or less.

8 The powder according to claim 1 or 2, wherein the ratio of the integrated intensity of the XRD peaks of tetragonal and cubic zirconia to the total integrated intensity of the XRD peaks of tetragonal, cubic and monoclinic zirconia in an XRD pattern obtained by the following XRD measurement, is from 50% or more and 99% or less.

Radiation source: Cu Kα radiation (λ = 0.15418 nm)

Measurement mode: continuous scan

Scan speed: 2 °/minute

Measurement range: 2θ = 26° to 33°

2θ = 72° to 76°

Accelerating voltage·current: 40 mA·40 kV

Divergence height-limiting slit: 10 mm

Divergence/entrance slit: 1°

Receiving slit: open

Detector: semiconductor detector (D/teX Ultra)

Filter: Ni filter

Goniometer radius: 185 mm

9. The powder according to claim 1 or 2, wherein the powder is a granulated powder.

10. A green body, comprising the powder according to claim 1 or 2.

11. A method for producing a calcined body, comprising a step of calcining the green body according to claim 10.

12. A method for producing a sintered body, comprising a step of sintering at least one of a green body containing the powder according to claim 1 or 2 and a calcined body obtained by calcining the green body.