CLAIMS

[Claim 1]

A black quartz glass consisting of a composition comprising 63 to 65 mass% of SiO_2, 18 to 24 mass% of TiO_2 and 12 to 17 mass% of Al_2O_3, wherein the sum of SiO_2, TiO_2 and Al_2O_3 is 100 mass%.

[Claim 2]

The black quartz glass according to claim 1, wherein the SCE reflectance at a wavelength of 350 nm to 750 nm is 8% or less.

[Claim 3]

The black quartz glass according to claim 1 or 2, wherein the brightness L^* is 20 or less, the absolute value of the saturation a^* is 2 or less and the absolute value of b^* is 9 or less in $L^*a^*b^*$ color system.

[Claim 4]

The black quartz glass according to any one of claims 1 to 3, wherein each content of metallic impurities other than Si, Ti and Al is 1 ppm or less.

[Claim 5]

The black quartz glass according to any one of claims 1 to 4, wherein the density is 2.3 g/cm^3 or more and 2.8 g/cm^3 or less.

[Claim 6]

The black quartz glass according to any one of claims 1 to 5, wherein the black quartz glass has a corrosion rate obtained by the following corrosion exposure test of 1/5 or less compared to the corrosion rate of a molten quartz glass obtained by the same corrosion exposure test:

Corrosion Exposure Test:

(1) preparing a glass sample of 20 mm × 20 mm × 2 mm thickness and masking a 7 mm × 7 mm area after forming an optical mirror surface on its surface;

(2) etching the entire surface of the masked glass surface with a reactive ion-etching apparatus, at 200 W for 4 hours under 14 Pa of the pressure in the apparatus, while flowing simultaneously CF_4 gas, O_2 gas and Ar;

(3) removing the mask from the glass surface and measuring the step size between the masked area and the corroded non-masked area;

(4) calculating the corrosion rate by the step size/the etching time.

[Claim 7]

The black quartz glass according to any one of claims 1 to 6, wherein the thermal expansion coefficient in the range of 30°C to 600°C is 20×10^{-7}/°C or more and 30×10^{-7}/°C or less.

[Claim 8]

The black quartz glass according to any one of claims 1 to 7, wherein the optical transmittance at a wavelength of 200 nm to 3000 nm with a thickness of 1 mm is 0.1% or less.

[Claim 9]

The black quartz glass according to any one of claims 1 to 8, which is obtained by filling a mixed powder of raw material of the black quartz glass into a mold and then melting at a maximum temperature of 1700 to 1900°C in an oxygen-free atmosphere, and cooling to room temperature.

[Claim 10]

A method for producing black quartz glass comprising:

mixing 63 to 65 mass% of a SiO_2 powder, 18 to 24 mass% of a TiO_2 powder and 12 to 17 mass% of an Al_2O_3 powder,

filling the mixed powder into a mold and then melting at a maximum temperature of 1700 to 1900°C in an oxygen-free atmosphere, and

cooling to room temperature to obtain the black quartz glass according to any one of claims 1 to 9.

[Claim 11]

The method for producing black quartz glass according to claim 10, wherein the oxygen-free atmosphere is a reduced pressure of 100Pa or less, a N_2 atmosphere, an Ar atmosphere, a He atmosphere or a combination thereof.

[Claim 12]

The method for producing black quartz glass according to claim 10 or 11, wherein the mold to be filled with the mixed powder has a shape similar to the shape after mechanical processing, with the volume of 1.01 or more of the shape after mechanical processing.

[Claim 13]

A product comprising a black quartz glass member made of the black quartz glass according to any one of claims 1 to 9.

[Claim 14]

The product according to claim 13, wherein the black quartz glass member is an optical component, a light-shielding member or an infrared heat absorption/storage member.

[Claim 15]

The product according to claim 14, wherein the optical component is a spectroscopic cell, a reflector for projectors or a connector for optical fibers, and the light-shielding member is a light-shielding member for semiconductor manufacturing apparatuses or for infrared heating apparatuses.