CLAIMS

1. A ceramic member comprising enstatite and boron nitride as constituents,

wherein the ceramic member is a sintered body in which the boron nitride is oriented in a single direction.

2. The ceramic member according to claim 1,

wherein an index of an orientation degree $K = |\log_{10}\{(I_{(100)}/I_{(002)})\parallel/(I_{(100)}/I_{(002)})\perp\}|$, which is given based on a ratio $(I_{(100)}/I_{(002)})\parallel$ between strength $I_{(002)}$ of x-ray diffraction along a (002) plane of a crystal of the boron nitride and strength $I_{(100)}$ of x-ray diffraction along a (100) plane when x-ray irradiation is performed in a direction which is perpendicular to an orientation direction of the boron nitride and a ratio $(I_{(100)}/I_{(002)})\perp$ between strength $I_{(002)}$ of x-ray diffraction along the (002) plane and strength $I_{(100)}$ of x-ray diffraction along the (100) plane when x-ray irradiation is performed in the orientation direction, is not less than 0.8.

3. The ceramic member according to claim 1 or 2,

wherein a coefficient of thermal expansion which is measured based on JIS R 1618 at 20°C to 250°C in a direction in parallel to a direction in which the boron nitride is oriented is (3 to 5) $\times 10^{-6}$/°C.

4. The ceramic member according to any one of claims 1 to 3,

wherein three-point bending strength measured based on JIS R 1601 is not less than 200 MPa.

5. The ceramic member according to any one of claims 1 to

4,

wherein relative density is not less than 99%.

6. The ceramic member according to any one of claims 1 to 5,

wherein boron nitrogen has a hexagonal crystal structure and is in a form of scale-shaped grains.

7. A probe holder which includes through holes capable of allowing probes formed of a conductive material to be inserted and accommodates the probes, the probe holder comprising:

a base material formed using the ceramic member according to any one of claims 1 to 6,

wherein the through holes are formed in the base material in a direction which is perpendicular to the orientation direction of the boron nitride.

8. A manufacturing method of a ceramic member comprising:

a mixing step of mixing boron nitride, silicon oxide, magnesium oxide, and sintering agent;

an external force acting step of making external force directed in a single direction act on a mixture mixed in the mixing process; and

a sintering step of sintering the mixture.

9. The manufacturing method of a ceramic member according to claim 8,

wherein the sintering agent contains yttrium oxide and aluminum oxide.

10. The manufacturing method of a ceramic member according to claim 8 or 9,

wherein the external force acting step and the sintering step are collectively performed by a hot pressing sintering method.

11. The manufacturing method of a ceramic member according to any one of claims 8 to 10,

wherein a sintering temperature in the sintering step is from 1200°C to 1300°C.

12. The manufacturing method of a ceramic member according to any one of claims 8 to 11,

wherein the sintering step is performed in a depressurized atmosphere or an inert atmosphere.

13. The manufacturing method of a ceramic member according to any one of claims 8 to 12,

wherein the boron nitride has a hexagonal crystal structure and is in a form of scale-shaped grains.

CLAIMS

1. A ceramic member comprising enstatite and boron nitride as constituents,

wherein the ceramic member is a sintered body (101) in which the boron nitride is oriented in a single direction,

wherein an index of an orientation degree $K = |\log_{10}\{(I_{(100)}/I_{(002)})\parallel/(I_{(100)}/I_{(002)})\perp\}|$, which is given based on a ratio $(I_{(100)}/I_{(002)})\parallel$ between strength $I_{(002)}$ of x-ray diffraction along a (002) plane of a crystal of the boron nitride and strength $I_{(100)}$ of x-ray diffraction along a (100) plane when x-ray irradiation is performed in a direction which is perpendicular to an orientation direction of the boron nitride and a ratio $(I_{(100)}/I_{(002)})\perp$ between strength $I_{(002)}$ of x-ray diffraction along the (002) plane and strength $I_{(100)}$ of x-ray diffraction along the (100) plane when x-ray irradiation is performed in the orientation direction, is not less than 0.8,

a coefficient of thermal expansion which is measured based on JIS R 1618 at 20°C to 250°C in a direction in parallel to a direction in which the boron nitride is oriented is (3 to 5) $\times 10^{-6}$/°C, and

three-point bending strength measured based on JIS R 1601 is not less than 200 MPa.

2. The ceramic member according to claim 1,

wherein relative density is not less than 99%.

3. The ceramic member according to claim 1 or 2,

wherein boron nitrogen has a hexagonal crystal structure and is in a form of scale-shaped grains.

4. A probe holder (1) which includes through holes (11) capable of allowing probes (3) formed of a conductive material to be inserted and accommodates the probes (3), the probe holder (1) comprising:

a base material formed using the ceramic member according to any one of claims 1 to 3,

wherein the through holes (11) are formed in the base material in a direction which is perpendicular to the orientation direction of the boron nitride.

5. A manufacturing method of the ceramic member according to any one of claims 1 to 4 comprising:

a mixing step of mixing boron nitride, silicon oxide, magnesium oxide, and sintering agent;

an external force acting step of acting external force in a predetermined direction on a mixture mixed in the mixing process such that the mixture is oriented in parallel to a direction which is perpendicular to the predetermined direction; and

a sintering step of sintering the mixture at a sintering temperature from 1200°C to 1300°C.

6. The manufacturing method of a ceramic member according to claim 5,

wherein the sintering agent contains yttrium oxide and aluminum oxide.

7. The manufacturing method of a ceramic member according to claim 5 or 6,

wherein the external force acting step and the sintering step are collectively performed by a hot pressing

sintering method.

8. The manufacturing method of a ceramic member according to any one of claims 5 to 7,

wherein the sintering step is performed in a depressurized atmosphere or an inert atmosphere.

9. The manufacturing method of a ceramic member according to any one of claims 5 to 8,

wherein the boron nitride has a hexagonal crystal structure and is in a form of scale-shaped grains.