

CLAIMS

1. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and the crystal grains are aligned so as to have a maximum length in -45° to $+45^{\circ}$ directions based on the first direction;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

2. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a value (aspect ratio) of the length in the first direction of the crystal grains/the length in the second direction of the crystal grains is 1.2 to 20;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

3. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a value of the average strength in the first direction/the average strength in the second direction is 0.55 to 0.9;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

4. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a resistivity in the first direction is $3.0 \times 10^{-3} \Omega\text{cm}$ to $25 \Omega\text{cm}$, and a resistivity in the second direction is $1.4 \times 10^{-3} \Omega\text{cm}$ to $40 \Omega\text{cm}$;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

5. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a resistivity in the first direction is 10 Ωcm to 20 Ωcm , and a resistivity in the second direction is 21 Ωcm to 40 Ωcm ;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

6. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a resistivity in the first direction is 0.8 Ωcm to 3.0 Ωcm , and a resistivity in the second direction is 2.5 Ωcm to 25 Ωcm ;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

7. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a value of a resistivity in the first direction/a resistivity in the second direction is 1.1 to 3.3;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

8. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and a value of a hardness in the first direction/a hardness in the second direction is 0.85 to 1.15;

wherein, with respect to peak intensities for the first direction and the second direction of XRD analysis, a value of a peak intensity in a (111) crystal plane direction of the first direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction perpendicular to the second direction.

9. An CVD-SiC structure, wherein the CVD-SiC structure is exposed to plasma inside a chamber, and the plasma is arranged to shine down from a top of the chamber,

wherein the CVD-SiC structure includes a crystal grain structure in which a length in a first direction is longer than a length in a second direction when defining a direction perpendicular to a surface most exposed to the plasma as the first direction and a direction horizontal to the surface most exposed to the plasma as the second direction and
 5 with respect to peak intensities in a crystal plane direction for the first direction and the second direction of XRD analysis,

a value of the first direction/a value of the second direction of a $[(200 + 220 + 311)]/(111)$ value is 1.0 to 4.4, and

a value of a peak intensity in the (111) crystal plane direction of the first
 10 direction/a peak intensity in the (111) crystal plane direction of the second direction is 0.2 to 0.95;

wherein the CVD-SiC structure includes a first surface which is most exposed to the plasma and developed in a direction perpendicular to the first direction and a second surface which is perpendicular to the first surface and developed in a direction
 15 perpendicular to the second direction.

10. The CVD-SiC structure of claims 1 to 9, wherein an average strength in the first direction is 133 Mpa to 200 Mpa and an average strength in the second direction is 225 Mpa to 260 Mpa.
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11. The CVD-SiC structure of claims 1 to 9, wherein a value of a resistivity in the first direction/a resistivity in the second direction is 0.25 to 0.95.

12. The CVD-SiC structure of claims 1 to 9, wherein a value of a resistivity in the
 25 first direction/a resistivity in the second direction is 0.04 to 0.99.

13. The CVD-SiC structure of claims 1 to 9, wherein a resistivity in the first direction is $1.8 \Omega\text{cm}$ to $3.0 \Omega\text{cm}$, and a resistivity in the second direction is $0.8 \Omega\text{cm}$ to $1.7 \Omega\text{cm}$.

30 14. The CVD-SiC structure of claims 1 to 9, wherein a value of a resistivity in the first direction/a resistivity in the second direction is 1.15 to 3.2.

15. The CVD-SiC structure of claims 1 to 9, wherein a resistivity in the first direction is $3.0 \times 10^{-3} \Omega\text{cm}$ to $5.0 \times 10^{-3} \Omega\text{cm}$, and a resistivity in the second direction is 1.4×10^{-3}

Ωcm to $3.0 \times 10^{-3} \Omega\text{cm}$.

16. The CVD-SiC structure of claims 1 to 9, wherein a hardness of the CVD-SiC structure is 2800 kgf/mm^2 to 3300 kgf/mm^2 regardless of a direction.

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17. The CVD-SiC structure of claims 1 to 9, wherein with respect to peak intensities in a crystal plane direction for the first direction and the second direction of XRD analysis, $[(200 + 220 + 311)]/(111)$ values are 0.7 to 2.1 in the first direction and 0.4 to 0.75 in the second direction, respectively.

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18. The CVD-SiC structure of claims 1 to 9, wherein with respect to peak intensities for the first direction and the second direction of XRD analysis, the peak intensities in a (111) crystal plane direction are 3200 to 10000 in the first direction and 10500 to 17500 in the second direction, respectively.

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19. The CVD-SiC structure of claims 1 to 9, wherein a thermal expansion coefficient in the first direction is $4.0 \times 10^{-6}/^\circ\text{C}$ to $4.6 \times 10^{-6}/^\circ\text{C}$, and the thermal expansion coefficient in the second direction is $4.7 \times 10^{-6}/^\circ\text{C}$ to $5.4 \times 10^{-6}/^\circ\text{C}$.

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20. The CVD-SiC structure of claims 1 to 9, wherein a value of a thermal expansion coefficient in the first direction/a thermal expansion coefficient in the second direction is 0.7 or more and less than 1.0.

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21. The CVD-SiC structure of claims 1 to 9, wherein a thermal conductivity in the first direction is 215 W/mk to 260 W/mk, and a thermal conductivity in the second direction is 280 W/mk to 350 W/mk.

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22. The CVD-SiC structure of claims 1 to 9, wherein a value of a thermal conductivity in the first direction/a thermal conductivity in the second direction is 0.65 to less than 1.0.

23. The CVD-SiC structure of claim 1, wherein in the CVD-SiC structure, at least a part of the first surface suitable for being in contact with a support part.

24. The CVD-SiC structure of claims 1 to 9, wherein the CVD-SiC structure is one of an edge ring, a susceptor, and a shower head.

25. The CVD-SiC structure of claims 1 to 9,

5 wherein a total sum of areas of the first surface is larger than a total sum of areas of the second surface.