What is claimed is:

1. A method for preparing a chromium-silicon alloy sputtering target material, comprising the following steps:

(1) filling chromium-silicon alloy powder having a target mass proportion into a mold, sealing the mold, and compacting the mold by vibration;

(2) degassing the mold compacted in step (1);

(3) subjecting the mold degassed in step (2) to hot isostatic pressing treatment at a temperature of 1000 ºC to 1350 ºC to obtain a crude chromium-silicon alloy sputtering target material; and

(4) machining the crude chromium-silicon alloy sputtering target material obtained in step (3) to obtain the chromium-silicon alloy sputtering target material;

wherein compacting by vibration in step (1) is performed for 3 min to 30 min, compacting by vibration in step (1) is performed at a vibration amplitude of 1 mm to 10 mm, and compacting by vibration in step (1) is performed at a vibration frequency of 50 times/min to 400 times/min;

the chromium-silicon alloy sputtering target has an oxygen content of less than 0.05%.

2. The preparation method of claim 1, wherein the hot isostatic pressing treatment in step (3) is performed at a pressure of 130 MPa to 180 MPa, and is optionally 140 MPa to 165 MPa.

3. The production method of claim 1 or 2, wherein the hot isostatic pressing treatment in step (3) involves keeping at the temperature and pressure for 2 h to 6 h, and is optionally 3 h to 5 h.

4. The preparation method of claim 1, wherein the chromium-silicon alloy powder having a target mass proportion in step (1) is prepared in an atomization method;

optionally, the atomization method comprises any one or a combination of at least two of gas atomization, centrifugal atomization, vacuum atomization and ultrasonic atomization, and is optionally gas atomization;

optionally, gas used for the gas atomization comprises any one or a combination of at least two of helium, nitrogen and argon, and is optionally argon.

5. The preparation method of claim 1 or 2, wherein the target mass proportion in step (1) is 40% ≤ Si (wt%) ≤ 70%, and is optionally 40% ≤ Si (wt%) ≤ 55%;

optionally, the chromium-silicon alloy powder having a target mass proportion in step (1) has a particle size of 150 micron (μm) to 400 μm, optionally 200 μm to 350 μm;

optionally, the chromium-silicon alloy powder having a target mass proportion in step (1) has a purity of above 3N5.

6. The preparation method of any one of claims 1 to 5, wherein the mold in step (1) is a stainless steel sheath;

optionally, before filling the powder into a mold in step (1), the method further comprises a cleaning step;

optionally, the cleaning is to clean an inner wall of the mold so as to ensure no pollution in the mold.

7. The preparation method of any one of claims 1 to 6, wherein compacting by vibration in step (1) is performed for 3 min to ~~30 min, optionally 3 min to~~ 15 min;

optionally, compacting by vibration in step (1) is performed at a vibration amplitude of ~~1 mm to10 mm, optionally~~ 3 mm and 7 mm;

optionally, compacting by vibration in step (1) is performed at a vibration frequency of ~~50 times/min to 400 times/min, optionally~~ 100 times/min to 300 times/min.

8. The preparation method of any one of claims 1 to 7, wherein degassing in step (2) is performed at a temperature of 400 ºC to 600 ºC, optionally 450 ºC to 550 ºC;

optionally, degassing in step (2) is performed at a vacuum degree of 5E-3 Pa to 1.5E-3 Pa, and optionally 4E-3 Pa to 2E-3 Pa.

9. The preparation method of any one of claims 1 to 8, wherein the hot isostatic pressing treatment in step (3) is carried out in a hot isostatic pressing furnace.

10. The preparation method of any one of claims 1 to 9, wherein the preparation method comprises the following steps:

(1) preparing chromium-silicon alloy powder having a target mass proportion of 40% ≤ Si (wt%) ≤ 70% by using a gas atomization method, then filling the chromium-silicon alloy powder into a pre-treated stainless steel sheath, sealing the stainless steel sheath, and compacting the stainless steel sheath by vibration;

wherein the chromium-silicon alloy powder has a particle size of 150 μm to 400 μm, and a purity of above 3N5;

compacting by vibration is performed for 3 min to 30 min, at a vibration amplitude of 1 mm to 10mm, and at a vibration frequency of 50 times/min to 400 times/min;

(2) heating the mold compacted in step (1) to 400 ºC to 600 ºC, and degassing under a vacuum degree of 5E-3 Pa to 1.5E-3 Pa;

(3) placing the mold degassed in step (2) into a hot isostatic pressing furnace, heating the hot isostatic pressing furnace to 1000 ºC to 1350 ºC and pressurizing the hot isostatic pressing furnace to 130 MPa to 180 MPa, and keeping at the temperature and pressure for 2 h to 6 h to carry out hot isostatic pressing treatment, to obtain a crude chromium-silicon alloy sputtering target material; and

(4) machining the crude chromium-silicon alloy sputtering target material obtained in step (3) to obtain the chromium-silicon alloy sputtering target material.

11. ~~A~~The preparation method of any one of claims 1 to 10, wherein the chromium-silicon alloy sputtering target material ~~prepared by the preparation method of any one of claims 1 to 10.~~has a density of greater than 99%.

~~12. The chromium-silicon alloy sputtering target material of claim 11, wherein the chromium-silicon alloy sputtering target material has a density of greater than 99%.~~

~~13. The chromium-silicon alloy sputtering target material of claim 11 or 12, wherein the chromium-silicon alloy sputtering target has an oxygen content of less than 0.05%.~~