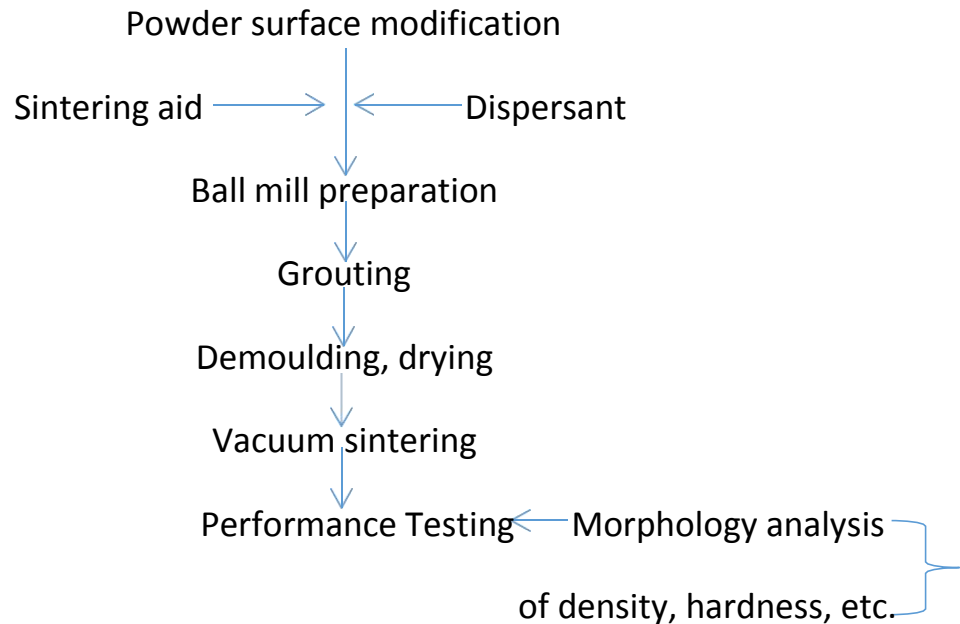


Silicon carbide vacuum sintering production process



1. A high-performance silicon carbide ceramic is prepared by adding a certain proportion of sintering aid to the aggregate of SIC powder by preparing a pre-formed body blank by a grouting method. The specific steps are as follows:

1) **Preparation of slurry:** mainly consists of the following steps: powder pretreatment, grinding of submicron Al_2O_3 and Y_2O_3 , weighing of each component, ball milling of the slurry, staleness, etc., the specific steps are as stated above.

2) **Grouting:** Grouting is based on the ability of the slurry to absorb moisture from the plaster mold. The essence is that the capillary suction through the plaster mold absorbs moisture to form a mud layer on the mold wall. In the traditional process, grouting has been in existence for more than 200 years. With the development of organic polymer materials centered on suspension agents, and due to the simplicity of grouting equipment, it is possible to form

large-scale complex structures and realize industrial intelligence. Turn.

Therefore, the traditional grouting method has been re-emphasized by people.

3) **Demolding the sample:** Pour the slurry into the plaster mold and let it stand for 10 to 40 minutes. Since the plaster mold has strong water absorption, the green body is separated from the inner wall of the plaster mold. At this time, the blank is directly removed from the plaster mold. take out.

4) **Drying:** The purpose of drying is to discharge the moisture of the green body and increase the strength of the green body. For inspection, repair, furnace and sintering.

5) **Post-processing of the blank:** Due to the size of the vacuum hot-pressing furnace and the limitation of the forming mold, the dried body cannot be directly subjected to pressureless sintering, and the cutting and the necessary smoothing treatment are required for sintering.

6) **Pressureless sintering:** Since the body contains a small amount of organic substances such as dispersant, the sintering process adopts a two-step method. The organic matter is completely decomposed at 600 ° C, and the dried body is placed in an oxidizing sintering furnace, and then preheated in an air atmosphere. Burning, controlling the heating rate and holding time, the blank discharging process can be considered to be completed between 150 and 600 °C.

The heating rate is 2 ° C / min, and the temperature is kept at 600 ° C for 30 minutes: the sample is taken out for cooling, placed in a vacuum hot pressing furnace and protected under normal pressure in an argon atmosphere, and the pre-fired body is firstly raised at a rate of 25 ° C / min. To 1400 ° C, and then at a rate of 12.5 ° C / min, the value of 1800 ~ 2000 ° C for 2 hours, until the temperature rise, the end of the heat preservation process is completed. When the temperature is lowered to 80 ° C, the SIC sintered product is taken out and the preparation process is completed .

Main machinery



Stirrer



Plaster core



Blank



Press



Repair

Drying oven



Vacuum sintering furnace