Influencing Factors on Technology of Silicon Graphite Composite Material

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Silicon Graphite Composite Material (SCGC) is a newly composite grain material composed of graphite, SiC and Si. With a series of excellent charactors, SCGC is widely used in kinds of bad environments such as high temperature, high speed, high pressure, ultra-low temperature, high corrosion, high grinding and so on. As a bio-ceramics material, SCGC has compatibility with tissues of the human body, and can be used as arificial hearts and artificial bones.

During the study of technology making SCGC "Liquid Silicon Penetration Mothed", the authors found that the charactors of SCGC are confined by the siliconized degree of the basic material. While to improve its siliconized degree, the following factors should well be considered: 1. The basic materials should be isotropic, and have a similar heat-inflation index with SiC, which is about $4.7\times10^{-6}/℃$; 2. In order to avoid distortion of scale and figure of samples, the basic materials should be graphitized; 3. To make sure that the basic materials have the greatest chance to be saturated by Liguid Silicon, their porocity should be about 50% and the open gaps shouldn't be less than half of the total ones; 4. to improve attacting area of unit volume with Liquid silicon, the bigger surfaces the samples have, the better; 5. As the weight-improving rate of the basic materials improve with the temperature, and SiC has a resolution temperature of 2200℃, the best siliconizing temperature should be controlled at about 2000℃; 6. The best siliconizing time is about an hour; 7. The environment of liquid silicon Penetration Mothed should has a vacuum of less than 10^{-3}Pa; 8. Two times of siliconizing are bestly needed.