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现代应用光学

1.5m量级SiC陶瓷素坯凝胶注模成型工艺

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摘要：利用凝胶注模成型工艺制备了1.5 m量级轻型碳化硅(SiC)陶瓷素坯。研究了颗粒级配、固相含量、混料时间对碳化硅浆料性能的影响。测试了SiC脱脂素坯的显微结构、力学性能和最终烧结体的机械性能和热学性能。结果表明：在最佳分散条件下，通过合理的颗粒级配，成功制备得到了固相含量高达65%，流动性良好的SiC陶瓷浆料。另外，随着固相含量的增加，SiC陶瓷浆料黏度急剧增大；随着混料时间的延长，浆料黏度出现先降低后升高的现象。将制备得到的浆料注入模具后，得到了1.5 m量级的SiC陶瓷素坯，脱脂后的素坯内部结构均匀抗弯强度为24.6 MPa。

关键词：凝胶注模 碳化硅(SiC) 陶瓷素坯

Gelcasting process of 1.5 m SiC ceramic green body

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Abstract: A  $\Phi$ 1.5 m silicon carbide(SiC) ceramic green body with a lightweight structure was prepared by gel casting method. The effects of Particle Size Distribution (PSD), solid loading and milling time on the SiC suspension were studied systematically. Then the microstructure and bending strength of the SiC green body, and the mechanical and thermal properties of Reaction Bonded SiC(RB SiC) were measured. The results show that the 65% solid loading SiC slurry with good flow properties is prepared by optimum PSD in a stable dispersion condition. The slurry viscosity of SiC increases rapidly with the solid loading. However, the apparent viscosity of SiC slurry reduces and then increases with the milling time. Moreover, the SiC slurry was injected into a mould, and a  $\Phi$ 1.5 m SiC ceramic green body was obtained. The ceramic green body after degreasing has a uniform interior structure and a bending strength of 24.6 MPa.

Keywords: gel casting SiC ceramic green body

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