

研究论文

原料颗粒级配对多孔陶瓷性能的影响

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摘要: 在传统有机泡沫浸渍工艺的基础上, 考虑浸渍浆体的颗粒级配, 以Stovall公式为基础, 建立了颗粒级配理论模型, 得到了颗粒级配系数(δ)与多孔预制体堆积密度间关系式, 推导出理论上最佳的颗粒级配系数为4。实验选取不同D50(中位粒径)和不同δ组份二氧化硅粉末制备了多孔陶瓷样品, 对样品的物理、化学性能进行研究并将实验结果与通过理论模型推导出的结果进行验证对比。结果表明: 采用颗粒级配系数为4左右时制备的多孔陶瓷孔隙结构、骨架表面颗粒结合性能达到最佳, 与通过模型推导得到的最佳颗粒级配系数4具有很好的吻合性。

关键词: 材料合成与加工工艺 多孔陶瓷 有机浸渍 颗粒级配

The grain composition' s influence on the performance of the porous ceramic

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Abstract: Based on the traditional polymeric sponge replication process to make porous ceramics, and considering the particle grading of the slurry powder, a novel theoretical models based on the stovall formula was built. The relationship between particle size distribution and stacking density of powder for the prefabricated porous ceramic was derived from the model and the largest stacking density can be obtained as particle grading parameter δ is 4. The different porous ceramics made of different median particle diameter D50 and δ were prepared and the physical and chemical properties were carried out. The test result was compared with the theoretical model. The results show that the pore structure, particles bonding and physical and chemical properties are optimum for the porous ceramic made by particle grading 4.2, which matches the theoretical result.

Keywords: synthesizing and processing technics for materials porous ceramic polymeric sponge particle size distribution

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