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研究论文

TiC/Ti₃SiC₂泡沫陶瓷的制备和性能

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摘要: 采用聚氨酯泡沫为原始骨架, 用高频感应加热反应熔渗制备TiC/Ti₃SiC₂泡沫陶瓷, 研究了在制备过程中不同阶段泡沫体的Ti含量对其相组成、微区化学成分、显微组织以及抗压性能的影响。结果表明, 随着泡沫体中Ti含量的增加, 在其骨架中相继生成TiC、Ti₃SiC₂及少量的Ti₅Si₃, 骨架的致密度提高, 泡沫材料的表现抗压强度增大。最终制得的TiC/Ti₃SiC₂泡沫陶瓷具有三维连通网络结构, 其平均表现抗压强度为19.4 MPa。

关键词: 无机非金属材料 泡沫陶瓷 高频感应加热 TiC-Ti₃SiC₂ 力学性能

Preparation and Properties of TiC/Ti₃SiC₂ Foam Ceramics

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Abstract: The TiC/Ti₃SiC₂ foam ceramics was prepared by high frequency induction heating reaction-melting infiltration using polyurethane foam as primary skeleton. The phase composition, microarea chemical content, micro morphology and structure, and apparent anti-compression properties of the foam materials obtained at different processing stages are investigated. The results show that the TiC/Ti₃SiC₂ foam ceramics consist of 3-D interconnected network frame of TiC, Ti₃SiC₂, and Ti₅Si₃ successively formed with the increasing of Ti content. The average apparent compressive strength of the prepared foam materials rises during reaction-melting infiltration, and reaches to 19.4 MPa when TiC/Ti₃SiC₂ foam ceramics formed.

Keywords: inorganic non-metallic materials foam ceramics high frequency induction heating TiC-Ti₃SiC₂ mechanical properties

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