

عنوان مقاله:

Effect of acrylate gel maker factors on properties of B₄C preforms for the fabrication of RBBC Ceramics

محل انتشار:

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خلاصه مقاله:

In this study, acrylate gel maker monomers (MAM and MBAM) were utilized in gel-casting process to fabricate boron carbide porous preform. In this research, by investigation of rheological behavior of the suspension, the effects of dispersant quantity on the viscosity of B₄C slurries were examined. It was found that optimum amount of TMAH was about ۰.۲ Wt.% of ceramic powder in such a low-toxic system. The green bodies were pyrolyzed at ۶۰۰ °C and infiltrated by molten silicon at ۱۶۰۰ °C for ۱ h under vacuum. The influence of the amount of monomers (MAM+MBAM) and also the ratio between monomers (MAM/MBAM) on the strength of dried green body was evaluated. The flexural strength of the green body is highest at an optimum value of the monomers ratio (RM=۵), and increases with increasing monomer content, reaching ۳۲ MPa when monomer content is ۲۵ Wt.%. The results show that molten silicon infiltration in porous B₄C preforms produced by gel-casting process is possible and fully dense RBBC ceramics were fabricated by this method. The microstructure of the RBBC ceramics consists of boron carbide particles with a core-rim structure, β-SiC and some residual silicon. The SiC carbide particles have a polygonal shape in composites fabricated in the presence of free carbon.

کلمات کلیدی:

Gel-casting, Preform, Boron carbide, Infiltration, RBBC ceramics

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