عنوان مقاله:

Investigation of B۴C effects on microstructure and mechanical properties ofporous silicon carbide preforms due to the liquid silicon infiltration

محل انتشار:

دهمین کنگره سرامیک ایران (سال: 1394)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

Reaction bonded silicon carbide (RBSC) composites are fully dense materials fabricated byinfiltration of compacted mixtures of silicon carbide and carbon by molten silicon. Freecarbon is formed as a result of the pyrolysis of an organic resin and carbon additive reactswith molten silicon to form secondary SiC grains that precipitate on the original SiCparticles. The environmentally unfriendly pyrolysis process and the presence of residualsilicon are serious drawbacks of this process. The study describes an alternative approach thatminimizes the residual silicon fraction by making use of a different percent of boron carbide.The addition of boron carbide provides an alternative source of carbon, thereby eliminatingthe need for pyrolized organic compounds. The hardness and young's modulus increased andfracture toughness, residual silicon and density of the composites decreased with increasingboron carbide content up to ۱۵ wt.%. The maximum value of fracture toughness of ۳.۷MPa.m۱/۲, young's modulus of ۴۰۱ GPa, and hardness of ۲۱۳۷ HV was obtained in minimumresidual silicon content (۹%).

کلمات کلیدی:

Silicon carbide, Boron carbide, pyrolysis, RBSC ceramics.

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