

SiC Particulate-Reinforced SiC Composites Fabricated by PIP Method Using Highly Concentrated SiC Slurry

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Abstract : SiC particulate-reinforced SiC ceramic composites (SiCp/SiC) were successfully fabricated using polymer impregnation and pyrolysis (PIP) method. The effects of green density, infiltrated method, pyrolytic temperature, and heating rate on the densification behavior of the composites were investigated. SiCp/SiC particulate reinforced composites with high relative density up to 88.06% were fabricated after 4 PIP cycles using SiC pellets with high green density. The pellets were prepared by drying 62-70 vol.% aqueous SiC slurries, and the maximum relative density of the pellets was 75.5%. The hardness of the as-fabricated SiCp/SiCs was 21.05 GPa after 4 PIP cycles, which value increased to 23.99 GPa after a heat treatment at 2000°C. Excellent mechanical properties, thermal stability, and short processing time render the SiCp/SiC composite as a challenging candidate for the high-temperature application.

Keywords : high green density, mechanical property, polymer impregnation and pyrolysis, structural application

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