

Dilatometric Studies of (SiO₂-RE₂O₃-Al₂O₃) Silicon Carbide Ceramics

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Abstract

Silicon carbide is considered an important structural ceramic that can be applied as abrasive, refractories and automotive engine components. This material can reach high densities during liquid phase sintering if suitable additives were used. The compositions containing silica, alumina and rare earth oxides have suitable characteristics to promote silicon carbide liquid phase sintering. In this paper, the kinetics behavior of silicon carbide ceramics is analyzed, with the help of additives based on the (SiO₂-RE₂O₃-Al₂O₃) system (RE = Y, Dy). Several compositions, containing 90 vol.% SiC were sintered in dilatometer at 1950°C/1h and in graphite resistance furnace from 1500°C/1h up to 1950°C/1h. The behavior of shrinkage rate was studied comparing the rare earth oxide used and the additive composition. Sintered materials were characterized by density and weight loss measurements. The crystalline phases were determined by X-ray diffraction technique. The kinetics behavior of these materials can be related to the formation of secondary crystalline phases.

Key words: *sintering, silicon carbide, oxide additives.*

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