

Preparation of SiAlON powder by SHS

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The beta-SiAlON powder was prepared by SHS (Self propagating High-temperature Synthesis process) using Si, Al, SiO₂, NH₄F as raw materials. Initial N₂ gas pressure in the SHS reactor was 50atm.

Si₃N₄ was used as a diluent, NH₄F was used as additives for nitridation. Preparation of the beta-SiAlON powder were caused by the effect of Si₃N₄, NH₄F addition. The peak of unreacted Si decreased increasing from 5wt% to 20 wt% of Si₃N₄. 15 wt% Si₃N₄ was the optimum reaction.

The optimum reaction of NH₄F for nitridation was 2~4 wt%. The optimum reaction system was Si-Al-SiO₂-diluent(Si₃N₄)-additives(NH₄F) and The optimum composition was 60wt%Si+13wt%Al+8wt%SiO₂+15%Si₃N₄+4wt%NH₄F. The shape of the beta-SiAlON produced in this condition was an irregular fiber with a length 5μm

The microstructure were characterized by using scanning electron microscopy(SEM) and X-ray diffraction (XRD) analysis techniques to reveal the mechanism.