Synthesis of Submicron SiC Powder from Carbonization of Iminodisilanenitrile

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The formation of silicon carbide powder by carbonization of iminodisilanenitrile (Si_2N_3H) has been investigated. Submicron SiC powder was produced by heating the mixture of carbon black and amorphous Si_4N_3H for 0.5-4 h at 1350°-1650°C under reduced pressure. The crystallinity of the products increased with increasing the reaction temperature and reaction time. The particles were spherical and had maximum size of 0.2-0.4 μm in diameter. A reaction process consisting of the formation of Si_3N_4 particles as an intermediate and the subsequent carbonization was proposed for the formation of present SiC particles. [Received August 8, 1985]

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Formation and Crystallization of Oxynitride Glasses in the System Si, Al, Mg/O, N

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Mg-Sialon oxynitride glasses were prepared from the mixtures of Si_3N_4, AlN, SiO_2, Al_2O_3 and MgO, and the glass forming regions were determined in the system Si, Al, Mg/O, N on cooling from 1550°C. Glasses containing up to 6.5 at% N were obtained. The substitution of nitrogen for oxygen in cordierite-based composition glasses resulted in significant increase of density, glass transition temperature, Vickers hardness and refractive index, and decrease of thermal expansion coefficient. In DTA curves, exothermic peak due to the crystallization of cordierite was observed in the range of 1000°C to 1200°C. The effect of heating time and temperature and Pt as a nucleation agent on the crystallization of the glasses was studied. It was found that optimum temperature to precipitate cordierite crystals was 1200°C and Pt was effective in controlling of the microstructure. The Mg-sialon glasses are considered to be self-nucleating and can, therefore, form finer-grained glass ceramics, compared with the corresponding oxide glasses. A microstructure of cordierite crystals dispersed in a oxynitride glass matrix was observed on the crystallization. Mg-sialon glass ceramics had thermal expansion coefficients comparable to its values of Si_3N_4 ceramics.

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