

<P57>

**Effect of  $\alpha/\beta$  Ratio of SiC on Strength and Fracture Toughness of  
*In Situ*-Toughened SiC-TiC Composites**

안현구, 김영옥, 이준근\*

서울시립대학교 재료공학과, \*KIST 세라믹스연구부

By using  $\alpha$ - and  $\beta$ -SiC starting powders, the effects of  $\alpha/\beta$  ratio of SiC on strength and fracture toughness of the hot-pressed and subsequently annealed SiC-30 wt% TiC composites were investigated. Its microstructures consisted of uniformly distributed elongated  $\alpha$ -SiC grains, equiaxed TiC grains, and an amorphous grain boundary phase. The  $\beta \rightarrow \alpha$  phase transformation of SiC led to the *in situ* growth of elongated  $\alpha$ -SiC grains during annealing. The aspect ratio showed a maximum at 1 %  $\alpha$ -SiC and decreased with increasing  $\alpha$ -SiC content in the starting powder. Such results suggest that microstructure of SiC-TiC composites can be controlled by changing  $\alpha$ -SiC content in the starting powder. The strength increased with increasing  $\alpha$ -SiC content when  $\alpha$ -SiC content was higher than 10% while the fracture toughness decreased with increasing  $\alpha$ -SiC content, i.e., the same trend with the variation of aspect ratio of SiC in the composites

<P58>

**Texture Development of SiC<sub>platelet</sub> reinforced SiC Composites**

Han-Kyu Sung, Sung-Do Kim, Kyeong-Sik Cho, No-Jin Park, and Sung-Jin Kim

Department in Materials Science & Engineering,

Kumoh National University of Technology

The development of texture in SiC/SiC<sub>platelet</sub> composites by hot-pressing and subsequent annealing was studied. Crystallographic texture type was characterized by measuring X-ray pole figures on the perpendicular plane to the hot-pressing direction. Observed all pole figures were nearly axially symmetric (fiber texture). The orientation distribution function (ODF) was obtained mathematically by a series expansion method from several (hkil) pole figures measured by Schulz reflection. The microstructure measured perpendicular to the hot-pressing direction showed mostly SiC<sub>platelet</sub> faces, while that parallel to the hot-pressing direction showed mostly SiC<sub>platelet</sub> edges. These microstructural anisotropy will be effect to the texture. The pole density of basal plane (0001) increased as annealing time increased, in contrast, other planes (hkil) nearly remained unchanged. Also, the pole density of basal plane (0001) increased as SiC<sub>platelet</sub> content increased.