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질화규소 복합체에서  $\text{Si}_3\text{N}_4$  whisker seed의 크기에 의한 영향  
The Effect of  $\text{Si}_3\text{N}_4$  Whisker Seeds Size on  $\text{Si}_3\text{N}_4$  Composites

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Tape casting에 의해 일방향으로 배향된 질화규소 휘스커를 종결정으로 함유한  $\text{Si}_3\text{N}_4$  복합체를 제조하였고, 그 종결정은 sedimentation에 의해 크기별로 분급 되었다. 또 분급된 종결정들은 6wt% $\text{Y}_2\text{O}_3$ -1wt% $\text{Al}_2\text{O}_3$  조성의 소결조제와 함께 각 5wt%씩 첨가되었다. 이렇게 하여 제조된 각 시편들이 종결정의 크기에 따라 다른 형태의 미세조직이 나타남을 SEM을 통하여 관찰하였고, 또 이러한 미세조직의 차이에 따른 기계적 특성의 변화를 조사하였다

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Refined Continuum Model on the Behavior of Intergranular Films in  
Silicon Nitride Ceramics

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To address the role of sintering additives on the behavior of intergranular glassy films in  $\text{Si}_3\text{N}_4$  ceramics, a refined continuum model was proposed based on the bond strength consideration between cations and anions in the film. The refined model indicated that the attractive van der Waals and repulsive steric forces would be modified with the incorporation of additive ions in the film. It also implied that the charge and size of ions, which determine the bond strength between cations and anions, and the amount of ions are important parameters to the force balance and behavior of intergranular films. Experimental evidences of (i) the effect of sintering additives on the thickness of intergranular films in  $\text{Si}_3\text{N}_4$  ceramics and (ii) the occurrences of squeezing out of intergranular films in hot-pressed  $\text{Si}_3\text{N}_4$  under a moderate external pressure (e.g., 25 MPa) were discussed to confirm the validity of the present model.