

## 고강도 LTCC 소재를 위한 복합구조의 유전특성

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### **Dielectric Properties of Complex Microstructure for High Strength LTCC Material**

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**Abstract** : The LTCCs (low-temperature co-fired ceramics) are very important for electronic industry to build smaller RF modules and to fulfill the necessity for miniaturization of devices in wireless communication industry. The dielectric materials with sintering temperature  $T_{\text{sint}} < 900^{\circ}\text{C}$  are required. In this study, we investigated with glass-ceramic composition, which was crystallized with two crystals. The microstructure, crystal phases, thermal and mechanical properties, and dielectric properties of the composites were investigated using FE-SEM, XRD, TG-DTA, 4-point bending strength test and LCR measurement. The starting temperature for densification of a sintered body was at  $779\sim 844^{\circ}\text{C}$  and the glass frits were formatted to the crystal phases,  $\text{CaAl}_2\text{Si}_2\text{O}_8$ (anorthite) and  $\text{CaMgSi}_2\text{O}_6$ (diopside), at sintering temperature. The sintered bodies exhibited applicable dielectric properties, namely 6-9 for  $\epsilon_r$ . The results suggest that the glass-ceramic composite would be potentially possible to application of low dielectric LTCC materials.

**Key Words** : LTCC, dielectric properties, glass-ceramic, crystallization