

**Al₂O₃ 충전제의 함량, 입도 및 소결시간에 따른 Al₂O₃/CAS glass
복합체의 저온 소결 및 유전 특성**

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**Low temperature and dielectric properties of Al₂O₃/CAS glass composites
by dose and particle size of Al₂O₃ filler and sintering time**

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Abstract : Influences of dose and particle size of Al₂O₃ filler and sintering time on the dielectric properties of Al₂O₃ filler/CaO-Al₂O₃-SiO₂ (CAS) glass composites were investigated with a view to applying the composites to the substrate material in low temperature co-firing ceramic (LTCC) technology. The increased addition of Al₂O₃ filler with the particle size of 1 μm monotonically decreased the density of the sintered specimen at a given temperature, while sintering of the 10 wt% Al₂O₃ added specimen at 925°C for 2 h demonstrated 96.0 % of the relative density, dielectric constant of 6.34, and quality factor of 2,760 GHz. As for the influence of the particle size of the Al₂O₃ filler, there existed an optimum particle size (30 μm) to ensure successful densification (96.5 %) of the 10 wt% Al₂O₃/CAS composites at 925°C for 2 h, at which condition the specimen demonstrated dielectric constant of 5.45 and quality factor of 3,740 GHz. When the influence of the sintering time of the 10 wt% Al₂O₃ (30 μm) added specimen was investigated at the sintering temperature of 925°C, an overly long sintering time degraded dielectric properties due to the over-sintering and the significant growth of the second phase such as anorthite, while the sintering for 4 h demonstrated 96.58 % of the relative density, dielectric constant of 5.4, and quality factor of 4,050 GHz. These results demonstrate the feasibility of the investigated material as the substrate material in LTCC technology.

Key Words : Al₂O₃, Ceramic/glass, Dose, Particle size, Sintering time