

## 저온소결용 $ZnAl_2O_4$ 세라믹스의 합성 및 유전 특성

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### Synthesis and dielectric properties of the $ZnAl_2O_4$ ceramics for low-firing

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#### Abstract

Synthesis and dielectric properties of glass-ceramic composites with zinc borosilicate glass(here after ZBS glass) were investigated as functions of  $ZnAl_2O_4$  phase synthesis method, glass addition (50~60 vol%) and sintering temperature (600~950°C for 2 hrs). The 50 vol% ZBS glass- $Al_2O_3$  and 60 vol% ZBS glass- $ZnAl_2O_4$  ensured successful sintering below 900°C. But the composition of 100-x-y vol% ZBS glass-x vol%  $Al_2O_3$ -y vol% ZnO exhibited poor sinterability below 900°C and the swelling phenomenon occurred in this composite with the large amount of ZBS glass. The sintering behavior of Glass-ceramic composites was affected by the crystallization of  $ZnAl_2O_4$  which was formed by the reaction between ZBS glass and  $Al_2O_3$ . Dielectric constant ( $\epsilon_r$ ),  $Q \times f$  value and temperature coefficient of resonant frequency ( $\tau_f$ ) of the composite with 50 and 60 vol% ZBS glass contents demonstrated ZBS- $Al_2O_3$ ( $\epsilon_r=5.7$ ), ZBS- $ZnAl_2O_4$ ( $\epsilon_r=5.8$ ) which is applicable to substrate requiring an low dielectric properties.

**Key Words** :  $ZnAl_2O_4$ ,  $Al_2O_3$ , Zinc borosilicate glass, Synthesis, Dielectric property