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La_2O_3-B_2O_3-TiO_2 (LBT) Glass and BaO-Nd_2O_3-TiO_2 (BNT) Ceramic Composites for Low Temperature Co-fired Ceramic (LTCC) Materials

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Miniaturization and higher degrees of integration play an important role in communication technology Therefore, dielectric materials with sintering temperature T_{sint}<900°C are required In this study, ceramics in the system BaO-Nd_2O_3-TiO_2 (BNT . 40-80 wt%) and rare earth derived borate glass (LBT . 60-20 wt%) were prepared This glass/ceramic composites were evaluated for sintering behavior, phase evaluation, densities, interface reaction and microwave dielectric properties It was found that the addition LBT glass frits significantly lowered the sintering temperature to below 900°C and as temperature increased (750-900°C) densification developed rapidly which was meant to be as over 95% of relative density The sintered bodies represented applicable dielectric properties, namely 20~40 for ε_r, ~10000 GHz for $Q*f_0$ The results suggest that the composites have a good potential for use as a low temperature co-fired ceramic composition for radio-frequency application.

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$Pb(Mg_{1/3}Ta_{1/3})O_3$-(Pb,Ba) TiO_3계의 Perovskite상 발달과 유전특성

Perovskite Development and Dielectric Properties of $Pb(Mg_{1/3}Ta_{2/3})O_3$-(Pb,Ba) TiO_3 System

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Pb계 relaxor ferroelectrics인 복합 perovskite $Pb(Mg_{1/3}Ta_{2/3})O_3$와 normal ferroelectrics인 $BaTiO_3$는 각각 -86°C와 130°C에서 8700과 12000의 최대유전상수를 나타내며, $Pb(Mg_{1/3}Ta_{2/3})O_3$-$BaTiO_3$ [PMT-BT]계에서는 거의 전 조성영역에서 상온 이하에서 최대유전상수를 나타낸다

본 연구에서는 490°C에서 최대유전상수를 나타내는 $PbTiO_3$를 $Pb(Mg_{1/3}Ta_{2/3})O_3$-$BaTiO_3$에 단계적으로 첨가한 $Pb(Mg_{1/3}Ta_{2/3})O_3$-(Pb,Ba)TiO_3 [PMT-BT-PT]계의 결정학적 상변태와 유전특성을 고찰해 보고자 한다 유전율의 현격한 감소를 야기시키는 pyrochlore상의 생성을 억제하기 위하여 B자리 전구체법을 사용하여 perovskite상의 합성을 시도하고, 생성상의 종류 및 분율을 X-선 회절을 이용하여 분석할 것이다 소결된 시편에 대하여서는 조성과 소결온도 및 주파수 변화에 따른 유전특성을 연구하고, 미세구조의 변화를 살펴보고자 한다.