

<6-10>

완화형 강유전성 $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - $\text{Pb}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ 세라믹스의
B자리 양이온 질서배열구조
Ordering Structures of B-Site Cations in Relaxor Ferroelectric
 $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - $\text{Pb}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ Ceramics

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대표적인 완화형 강유전체인 $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ 의 Nb^{5+} 를 Nb^{5+} 와 이온반경이 같고 원자량이 약 2배인 Ta^{5+} 으로 치환한 $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ - $\text{Pb}(\text{Mg}_{1/3}\text{Ta}_{2/3})\text{O}_3$ 고용체의 질서배열 거동을 조사함으로써 Pb계 복합 perovskite화합물, $\text{Pb}(\text{B}'^{2+}_{1/3}\text{B}''^{5+}_{2/3})\text{O}_3$ 의 완화형 강유전특성과 밀접한 관계에 있는 B자리 양이온 질서배열 구조에 미치는 B''자리 양이온의 질량효과에 대하여 고찰하였다. [$r(\text{Nb}^{5+}) = r(\text{Ta}^{5+}) = 0.78\text{\AA}$, $\text{AW}(\text{Nb}^{5+}) = 92.906$, $\text{AW}(\text{Ta}^{5+}) = 180.947$] XRD, TEM, Raman spectroscopy 등으로부터 $\text{Pb}(\text{B}'^{2+}_{1/3}\text{B}''^{5+}_{2/3})\text{O}_3$ 의 B'과 B''이온간의 질량차이가 클수록 단거리 영역에서의 비화학양론적 1:1 질서배열이 촉진됨이 밝혀졌다

<6-11>

Crystal Structure and Microwave Dielectric Properties of
(1-x) NdAlO_3 - x CaTiO_3 Ceramics

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Crystal structure and microwave dielectric properties of (1-x) NdAlO_3 - x CaTiO_3 ceramics have been investigated. NdAlO_3 has a rhombohedral structure and it maintained up to x = 0.1. When x exceeded 0.1, the crystal structure of the specimens changed to the orthorhombic. Two types of the second phases were observed in (1-x) NdAlO_3 -x CaTiO_3 ceramics. For the specimens with x ≤ 0.3, $\text{Nd}_4\text{Al}_2\text{O}_9$ second phase was observed. Al rich second phase was found in the specimens with x ≥ 0.5. The dielectric constant (ϵ_r) and the temperature coefficient of resonant frequency (τ_f) increased with the increase of x. Q × f value of the specimens increased with x and exhibited the maximum when x = 0.5. The microwave dielectric properties of Q × f = 45000, $\epsilon_r = 45$ and $\tau_f = -1.5$ ppm/°C were obtained for 0.3 NdAlO_3 - 0.7 CaTiO_3 ceramics.