

## <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  $\text{Nb}^{5+}$ 를  $\text{Nb}^{5+}$ 와 이온반경이 같고 원자량이 약 2배인  $\text{Ta}^{5+}$ 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) $\text{NdAlO}_3$ - x $\text{CaTiO}_3$ Ceramics

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Crystal structure and microwave dielectric properties of (1-x) $\text{NdAlO}_3$  - x  $\text{CaTiO}_3$  ceramics have been investigated.  $\text{NdAlO}_3$  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) $\text{NdAlO}_3$ -x  $\text{CaTiO}_3$  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 ( $\epsilon_r$ ) and the temperature coefficient of resonant frequency ( $\tau_f$ ) increased with the increase of x.  $Q \times f$  value of the specimens increased with x and exhibited the maximum when x = 0.5. The microwave dielectric properties of  $Q \times f = 45000$ ,  $\epsilon_r = 45$  and  $\tau_f = -1.5 \text{ ppm}/^\circ\text{C}$  were obtained for 0.3  $\text{NdAlO}_3$  - 0.7  $\text{CaTiO}_3$  ceramics.