P-051

ORDERING STRUCTURE OF La AND Na MODIFIED $Ba(Mg_{1/3}Nb_{2/3})O_3$ CERAMICS, JONG HOO PAIK, S. NAHM, AND J. D. BYUN(Dept. of Mat. Scien. and Eng., Korea Univ., Seoul 136-701, Korea) H. J. LEE*(New Material Evauation Center, Korea Research Institute of Standards and science, Yusong, P.O. Box 102, Taejon, Korea)

The ordering behavior of $Ba(Mg_{1/3}Nb_{2/3})O_3$ (BMN) ceramics modified by La and Na(or K) ions was investigated using X-ray diffraction pattern (XRD) and transmission electron microscopy (TEM). The 1:2 ordering found in BMN was transformed into 1:1 ordering with the La content and reached maximun values for $(Ba_{1/2}La_{1/2})(Mg_{1/2}Nb_{1/2})O_3$. For the BMN modified by the La and Na, 1:2 ordering structure was maintained. However, for the specimen sintered at high temperature, 1:2 ordered structure was transformed into disordered and 1:1 ordered structure.

P-052

THE EFFECT OF TiO_2 AND SnO_2 ON THE MICROWAVE DIELECTRIC PROPERTIES OF $Ba(Mg_{1/3}Ta_{2/3})O_3$ CERAMICS, CHANG HAK CHOI, S. NAHM, AND J. D. DONG(Dept. of Mat. Sci. and Eng., Korea Univ., Seoul, 136-701, Korea) M. H. KIM(Dept. of Mat. Sci. and Eng., Changwon National Univ., Changwon, 641-773, Korea)

$Ba(Mg_{1/3}Ta_{2/3})O_3$ (BMT) ceramics has attractive micrwave dielectric properties. However, BMT is difficult to sinter. In this investigation, small amounts of TiO_2 and SnO_2 were added to improve the sinterablility and Q-values. The maximum relative density of BMT was attained with 0.2 mol% addition of TiO_2(or SnO_2). The degree of ordering, lattice distortion and microstructure were not significantly changed with the addition of TiO_2(or SnO_2). However, with the addition of 0.2 mol% TiO_2(or SnO_2), the Q-value was improved significantly.

P-053

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The microwave dielectric properties of BaTi4O9 modified BaWO3 ceramic additions to glass and CuO have been investigated. The objective was to identify compositions in the the commercial glass system Ca-B-Si-Al-Mg and CuO that would lower sintering temperature of the dielectric in order to cofired with low loss conductors such as siver and gold. The sintering temperature of 1020℃ can be realized for added to 5wt% glass and dielectric constant (r=31) and quality factor (Q×fo = 13,500) obtained. The addition of CuO at the BaTi4O9 + BaWO3, 3wt% + glass 5wt% considerably improved the low sintering temperature and does not remarkably affect the dielectric properties. A 1.0wt% addition of CuO gave the dielectric constant (r=32) and quality factor (Q×fo = 15,500) at 950℃ for 2 h sintering in air. Results of XRD analysis and scanning electron microscopy and the effect of the CuO content are also presented.

P-054

ELECTRICAL CONDUCTIVITY IN THE BROWNMILLERITE SYSTEM $Ba_2(In_{1-x}M_x)_2O_5$ (M = Ga, Al), H.YAMAMURA, H.HAMAZAKI and K.KAKINUMA, (Dept. Appl. Chem., Fac. of Eng., Kanagawa Univ. Yokohama 221 Japan), T. MORI and H. HANEDA (NIRIM, 1-1, Namiki, Tsukuba, 305 Japan)

The solid solution system $Ba_2(In_{1-x}M_x)_2O_5$ (M=Ga,Al)($0 \leqq x \leqq 0.5$) were prepared by a conventional ceramic technique, where the samples were sintered at 1400℃ in air. While $Ba_2In_2O_5$ showed orthorhombic brownmillerite phase, cubic perovskite phases were obtained in the composition range $0.3 \leqq x \leqq 0.5$ and $0.2 \leqq x \leqq 0.5$ for the Ga and the Al system, respectively. The electrical conductivity measured by DC 4 terminal method showed sharp increase around a phase transition temperature (T_d) for the brownmillerite phase, and T_d shifted to lower temperature with increase in the composition, x. However, the conductivity of the samples with the cubic perovskite phase did not show such a sharp increase, and decreased with increase in the composition, x. The phase transition was also investigated by high temperature XRD. T_d values obtained by high temperature XRD were about 100℃ higher than those obtained by the electrical conductivity. The difference of T_d values was discussed from a view point of ordering in tetrahedral site in cubic perovskite structure.

POSTER SESSION