Distribution of Sr Ions in Tungstenbronze-type-like $(Ba_{1-\alpha}Sr_{\alpha})_{6-3x}R_{8+2x}Ti_{18}O_{54}$ (R = Sm, Nd) Solid Solutions

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Tungstenbronze-type-like $(Ba_{1-\alpha}Sr_{\alpha})_{6-3x}R_{8+2x}Ti_{18}O_{54}$ (R = rare earth) solid solution is one of the microwave dielectric materials. The crystal data is as follows: orthorhombic, *Pbnm* (No. 62), $a \approx 12$, $b \approx 22$, $c \approx 7$ Å and $Z = 2$. The crystal structure of the solid solution is composed of two kinds of large cation sites: four pentagonal sites with Ba ions and ten rhombic sites with Ba, Sr and R ions in the framework formed by TiO_6 octahedron.

These single crystals for R = Sm and Nd system were synthesized by conventional cooling method and FZ method, respectively. The X-ray diffraction data were obtained by a diffractomater with imaging plate (Rigaku; R-AXIS RAPID). Structural parameters were refined by full-matrix least-squares (RADY) [1].

All Sr ions occupied rhombic sites. Especially, one rhombic sites had more amount of Sr ions as compared with another rhombic sites in both of the R = Sm and Nd system. These solid solutions have relationship between distribution of cations and microwave dielectric properties [2]. Therefore, improvement of these properties with increasing composition α is lead by substituting Sr ions for Ba ions.

[1] Sasaki S., *XL Report, ESS, State University of New York*, 1982, 1–17. [2] Ohsato H., *J. Eur. Ceram. Soc.,* 2001, **21**, 2703–2711.

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