

MS13-1-24 Synthesis and structural analysis of new materials ferroelectric $\text{Ba}_{(2-x)}\text{Sr}_x\text{GdFeNb}_4\text{O}_{15}$ solid solution with $(0 \leq x \leq 2)$
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Abstract

The structural study of $\text{Ba}_{(2-x)}\text{Sr}_x\text{GdFeNb}_4\text{O}_{15}$ powders with $(0 \leq x \leq 2)$ has been reported. All samples were prepared using the conventional solid-state reaction. XRD results confirmed that all compounds have a tetragonal tungsten bronze (TTB) structure with space group $P4/mbm$, where A 1 sites are exclusively occupied by Gd^{3+} . Ba^{2+} and Sr^{2+} ions are located in the A2 sites while the Fe^{3+} and Nb^{5+} ions are randomly distributed between the B1 and B2 sites. The Raman spectra of the powders showed mainly multi-component and broad bands related to the internal vibrations of the octahedral MO_6 . The size of the A-site ions decreases when the Nb/Fe-O stretching changed. The evolution of the O–Nb/Fe–O bending vibrations as a function of the substitution rate x , seems to be a signature of the phase modifications. Infrared spectroscopy (IR) indicated the presence of stretching vibration bands as Nb/Fe-O, but also some strain vibration bands as H-O-H and O-H. Finally, Scattering Electron Microscopy (SEM) analyses show clearly the formation of TTB structure with uniform and dense grains with some phase of GdNbO_4 .