

Preparation and characterization of new $\text{Bi}_{1.5-x}\text{CuNb}_{1.5+x}\text{O}_{7+x}$ pyrochlores

ABSTRACT

A new pyrochlore solid solution, $\text{Bi}_{1.5-x}\text{CuNb}_{1.5+x}\text{O}_{7+x}$ has been synthesized using conventional solid state method. The synthesized ceramic samples were fired at 925°C and their phase purities were analyzed using Shimadzu XRD-6000, X-ray powder diffractometer. The refinement process was performed using Chekcell programme with Fd-3m symmetry. The cubic pyrochlore structures were confirmed with $a = 10.5024$ (3) Å and 10.5092 (5) Å for $x = 0.1$ and $x = 0.2$, respectively. Lattice constants of the cubic pyrochlore have been found increased with increase of Nb content. On the other hand, the resulting powder was pelletized and sintered at sintering temperature prior to impedance spectroscopy (IS) measurement. The electrical measurement was carried out in the frequency range of 0.1 Hz – 10 MHz over a temperature from room temperature to 800°C , in both cooling and heating cycles.

Keyword: Pyrochlores; Impedance spectroscopy; Nb substitution.