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IMPEDANCE SPECTROSCOPY ON HIGH DIELECTRIC PERMITTIVITY OF Ca1-xSrxCu3Ti4O12 CERAMIC SAMPLES

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ABSTRACT

Ca_1-x$SrxCu_3Ti_4O_{12}$ (x = 0.0, 0.1, 0.5) ceramics has been doped on Ca site with strontium using solid state reaction technique. Impedance measurement was done from 30 ^oC to 250 ^oC in frequency range of 10-2 Hz to 106 Hz. X-ray diffraction pattern shows single phase for all samples, while cubic structure with lattice parameter a = 7.3870Å is obtained for undoped sample. In complex impedance plot, three semicircular arcs represent electrode effect, grain boundary and bulk responses are observed. The results ware fitted using series network of three parallel RC circuits. The value of resistance is increasing while the value of capacitance has minor changes when temperature decreased. From Arrhenius plot of resistivity data for x = 0.1, the activation energy, Ea are 0.145 eV and 0.320 eV for bulk and grain boundary regions, respectively. Meanwhile, the Ea value for x = 0.5 are 0.137 eV for bulk regions, and 0.464 eV for grain boundary regions.

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