

Dielectric Properties of Ternary Composite Based on Complex Perovskite Oxides Synthesized by Semi-Wet Route

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Abstract : Ceramics of 0.6 CaCu₃TiO₁₂ - 0.2 Bi₂/3Cu₃TiO₁₂ - 0.2 Y₂/3Cu₃TiO₁₂ (i.e. 0.6CCTO-0.2BCTO-0.2 YCTO) were prepared via semi - wet route. The phase structure of the sample was identified by X-Ray diffraction. The micro structure of the sample was observed by SEM, which displays grains of different shapes having diameter in range of 2 μm-4 μm. We have studied the frequency and temperature dependence of permittivity and impedance of the compound with LCR Meter in the range of 100 Hz-1 MHz and 300-500 K. The material shows its highest dielectric constant (428000) at 100 Hz and 368 K. The material shows Debye-like relaxation and their dielectric constant are independent of frequency and temperature over a wide range. The sample shows two electrical responses in impedance formalism, indicating that there are two distinct contributions. We attribute them to grain and grain boundaries in the ceramic sample and explain the dielectric behaviors by Maxwell-Wagner relaxation arising at the interfaces between grain and their boundaries.

Keywords : complex perovskite, ceramics composite, impedance study, SEM

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