

The sintering effect of lanthanum-calcium manganite doping on microstructure and non-linear coefficient of zinc oxide varistor

ABSTRACT

The zinc oxide based varistor are widely used as circuit protective devices by literally absorbs these dangerous surges and spikes or grounding this unwanted magnitudes. In this research, zinc oxide is added with 0.5 mol % CaMnO_3 as an additive and 0.2 mol % of rare earth doped of lanthanum oxide. Citrate-gel method is used as fabrication method. Complex compound undergoes sintering process which varied at 900 °C, 950 °C and 1000 °C, while, the sintering time are setting at 1 hour and 2 hours. Thermo gravimetric analysis (TGA) shows the forming of CaMnO_3 at 334-1000 °C. Fourier Transform Infrared (FTIR) spectra proved that the functional group present are -O-H, C-H and C-O. The surface morphology with the grains size below 1 μm was observed by Scanning Electron Microscopy (SEM). The varistor ceramics was calculated from data analysis of I-V characteristics obtained through a Source Measure Unit (Keithley 236). The calculation of α is done by using Origin Pro8.0 software. I-V characteristic shows the value of α in the range of 1.00 to 4.05.

Keyword: Ceramics; Lanthanum calcium manganite; Microstructure; Non-linear coefficient; Zinc oxide varistor