PREPARATION AND CHARACTERIZATION OF LOW VOLTAGE TIN OXIDE VARISTORS

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Varistors are polycrystalline ceramics of high density with non-ohmic properties that depend on typical grain boundary phenomena[1]. The electrical properties are highly dependent on the resultant microstructure that is dependent on chemical composition, sintering and grain size[2] of the powder of the composition ($98,9\%SnO_2+0,5\%CoO+0,05\%Nb_2O_5+0,05\%Cr_2O_3+0,5\%Bi_2O_3$)[3]. The calcined powders with different grains size, which ranged from 6 to 12 μm. The powders were conformed at 100 MPa and then sinterized at 1350 °C for 120, 240 e 360 min in tubular furnace with a heating and cooling rate of 3 °C/min. The results showed that non-linear electric properties depend on the grain size that, on the other hand depend on the time of sintering[4]. These samples obtained grains the most of 80μm, decreasing the number of barriers by unit length. The samples with bismuth oxide replacing partially the cobalt showed order broken-down voltage reduction of 3300 V/cm, reaching 600v/cm with α between 1,6 and 6 and densities between 90% and 93,6% of pure tin oxide. The crystalline phases were characterized by XRD and EDX methods. Thus, it was found that cassiterite (SnO_2) is the primary phase and cobalt stannate (Co_2SnO_4) is the secondary phase, yet showed in other samples without bismuth oxide dopant[5].

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