

Sintering atmosphere effects on the BaZn_{1/3}X_{2/3}O₃ electroceramic properties with X = Zn or Nb

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Abstract

Complex perovskite oxides BaZn_{1/3}X_{2/3}O₃ (where X = Zn or Nb) have been broadly investigated for their attractive dielectric properties. For example BaZn_{1/3}Ta_{2/3}O₃ (usually called BZT) exhibits high relative dielectric constant close to 30, which is very stable with temperature ($\alpha = 0$ ppm/°C) associated with very low dielectric losses ($\tan \delta \approx 10^{-3}$) measured at 1MHz. These two ceramic materials are suitable in applications such as hyperfrequency resonators and multi layers ceramic capacitors (MLCC). In order to decrease the cost of these last electronic components, the expensive alloys usually used as electrodes (Pd/Ag) have to be replaced by cheaper ones like nickel. Unfortunately high temperatures are required to sinter the material and the oxidation of Ni occurs during this treatment. The aim of this work is to explore the effect of several sintering atmospheres on the properties of our compounds, in order to find one which could fit with the use of nickel.