

## Dielectric and Microstructural Properties of $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ Synthesized by the Coprecipitation Technique

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Polycrystalline ceramics are of great importance in the electronic industry due to their characteristics such as durability and stability. For applications such as volatile access memory devices or supercapacitors, a high electrical permittivity ( $\epsilon'$ ) in general around  $10^3$  is required. Such materials should be stable in wide temperature and frequency ranges and exhibit low dielectric losses [1]. Oxides with perovskite-type structure, as  $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$  (CCTO), exhibit such characteristics. In this work, CCTO powders were synthesized by the oxalate coprecipitation, and a polymer or a glass-type additive were used as sintering aid. The synthesized powders were calcined at 800 °C before introduction of the additive. The pellets were sintered at temperatures between 1070 and 1090 °C for 12 hours. The main purpose of this work was to verify the effects of the method of synthesis and the additive on the microstructure and dielectric properties of CCTO. The characterization techniques used were X-ray diffraction, measurements of electric permittivity and dielectric loss by impedance spectroscopy and the microstructure was observed by field emission scanning electron microscopy. Results showed that the CCTO cubic phase was obtained after the calcination step, as well as high values of electrical permittivity at room temperature. It was also observed that the additive has great influence on the grain growth and on the dielectric properties of the sintered ceramics.

[1] J. R. Li, IEEE Transactions on Dielectrics and Electrical Insulation 11 [3], 534 (2004).