

EFFECT OF THE SINTERING TEMPERATURE ON THE DIELECTRIC CHARACTERISTICS OF CERAMICS $\text{Ca}(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$

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Ceramics materials ABO_3 with perovskite structure are very attractive due to their applications in many devices as capacitors, piezoelectric actuators, pyroelectric infrared detectors, electro-optical modulators, FRAMs... Barium titanate (BaTiO_3) and strontium titanate (SrTiO_3) have been intensively investigated worldwide whereas the studies on calcium titanate (CaTiO_3) remain still limited. In a previous work we have investigated the system $(1-x) \text{CaTiO}_3 - x\text{CaF}_2 - x\text{LiF}$ at 950°C and a new solid solution was obtained in the range $0 \leq x < 0.40$. The subject of this paper is to examine the effect of the sintering temperature on the dielectric characteristics of ceramics with general composition $\text{Ca}(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$. Indeed, the sintering temperature is one of the most important parameters which affect significantly the densification mechanism as well as the microstructure and the electrical properties of ceramics.

Mixtures of $(1-x)$ mol. % CaTiO_3 , x mol. % CaF_2 and x mol. % LiF are dry-ground, compacted to pellets and then air-fired at different temperatures. Dielectric measurements are performed from room temperature up to 500°C at two frequencies: 100Hz, 1 kHz. The curves giving the temperature dependence of the permittivity (ϵ'_r) and the dielectric losses ($\tan\delta$) show several phenomena which could be ascribed to polymorphic transformations. Both ϵ'_r and $\tan\delta$ are strongly dependent on the sintering temperature and the measurement frequency. The optimal sintering temperature is found to be of 950°C for a holding time of 4hours.