

FLUORIDATED BaTiO₃ CERAMICS FOR MULTILAYER CAPACITORS

L. BENZIADA-TAIBI

Laboratoire de Métallurgie Structurale, Institut de Chimie, U.S.T.H.B., B.P. 32, El-Alia, Bab-Ezzouar 16111, Algiers, Algeria

The worldwide interest in ferroelectrics is to a large extent due to:

- ✓ Their numerous applications such as capacitors, piezoelectric actuators, pyroelectric infrared detectors, electro optical modulators and recently non volatile memories or FRAMs which will be the memories of the future computers;
- ✓ The success of thin film deposition techniques which allow the sintering of thin films at low temperature.

Among ferroelectric materials, BaTiO₃ is one of the best known examples which has been intensively studied. The aim of the present work is to fabricate high dielectric constant ceramics by sintering BaTiO₃ together with PbF₂ and LiF at low temperature with the view to reducing the cost price of capacitors.

Various amounts of PbF₂ and LiF are added to BaTiO₃. The mixtures are wet-ground and the obtained powders are cold-pressed to pellets. These disks are then air-fired at 800, 900, 1000 or 1100 °C for 1, 2 or 4 hours. The complex permittivity $\epsilon_r = \epsilon'_r - \epsilon''_r$ is measured as a function of temperature (100 – 450K) and frequency ($10^2 - 4.10^7$ Hz). The real component ϵ'_r shows very broad maxima, the values varying from 4000 to approximately 8000. Dielectric losses less than 1 % are observed at low frequencies while a dielectric relaxation occurs at high frequencies. The temperature dependence of ϵ'_r and the values of $\tan \delta$ are consistent with the class II, type Z5U capacitor norms.