

DIELECTRIC AND PIEZOELECTRIC PROPERTIES OF 0.95 BaTiO₃ – 0.05 CaF₂ – 0.05 LiF FERROELECTRIC CERAMICS

L. BENZIADA – TAÏBI

Laboratoire de Métallurgie Structurale, Institut de Chimie, U.S.T.H.B., ALGERIA.

In the race to produce better computer memories with higher and higher densities, ferroelectric materials offer unique advantages: small size, non-volatile memory, high speed, low power supply... Most of the area in modern memory chips is take up by capacitors. The purpose of this study is to prepare BaTiO₃ derived ceramics with high dielectric constants which could be used for making cheaper multilayer capacitors.

Fine BaTiO₃ powder is added with 5 mol. % (CaF₂ – LiF) and wet-ground. Cold-pressed pellets are then prepared from this mixture and air-fired at 800, 900, 1000 or 1100 °C for 2, 4 or 8 hours. The X-ray diffraction patterns of the ceramics show a tetragonal or a cubic symmetry. The dielectric properties are investigated from 100 to 450 K in the frequency range $10^2 - 4 \cdot 10^7$ Hz. Electromechanical resonance experiments are performed on polarized ceramics. The thermal evolution of ε_r' shows a diffuse phase transition and a decrease of T_C. Dielectric constants as high as 5000 are obtained. The dielectric dispersion is small for frequencies lower than 10^7 Hz and becomes more significant beyond 10^7 Hz. The value of T_C is independent of frequency. This behaviour is in agreement with non relaxor-ferroelectric.