INFLUENCE OF $CaTiO_3$ GRAIN-SIZE DISTRIBUTION ON THE DIELECTRIC PROPERTIES OF $Ca(Ti,Li)(O,F)_3$ CERAMICS

A. MEZROUA[1] and L. TAÏBI-BENZIADA[2]

[1] EMP, Bordj-El-Bahri, ALGERIA

[2] USTHB, Bab-Ezzouar, ALGERIA

Advanced ceramics are of great interest for a wide range of applications and the world market for these materials is in fast-expanding. Among these materials, titanates have a combination of electrical, mechanical, thermal and optical characteristics that make them attractive for several applications. The objective of this study is to determine the effect of $CaTiO_3$ grain size distribution on the dielectric properties of ceramics sintered at low temperature with the aid of the mixture CaF_2 + LiF. Calcium titanate is previously synthetized by calcination at 850°C. The powder obtained is ground then separated in several grain size brackets. Various molar compositions (1-x) CaTiO3 + $xCaF_2$ + xLiF are prepared with each granulometry of calcium titanate powder and shaped to disks. The pellets thus obtained are sintered at 950 ° C during 4hours. RX diffraction analyses are carried out at room temperature and SEM observations are achieved. The dielectric permittivity and the dielectric losses are measured at 100Hz and 1 kHz between room temperature and 500 ° C. Several dielectric phenomena which are frequency dependent are detected. The results demonstrate typical relaxor behavior in these new ceramics.

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