

MICROSTRUCTURES AND DIELECTRIC PROPERTIES OF SrTiO₃ BASED CERAMICS SINTERED AT LOW TEMPERATURE

L. TAÏBI-BENZIADA *, H. KERMOUN

*Laboratory of Materials Sciences , Faculty of Chemistry , U.S.T.H.B., P.O. Box 32 El-Alia ,
16111 Bab-Ezzouar , Algiers , ALGERIA (Fax : 213 21 24 73 11)*

The perovskites ABO₃ have various properties that make them attractive in the fabrication of a lot of electronic devices. Among these materials, BaTiO₃ is the best-known example which has been intensively studied worldwide. In comparison with barium titanate, the studies on SrTiO₃ are limited. The solid solution (Ba_{1-x}Sr_x)TiO₃ is of particular interest for the development of Ferroelectric Random Access Memories (FRAMs). The purpose of this work is the investigations of the microstructures and dielectric properties of SrTiO₃ based ceramics sintered at low temperature thanks to the fluorides MF₂ (M = Ca , Sr or Ba) and LiF.

Cold-pressed pellets are prepared from the mixture SrTiO₃-1MF₂-4LiF (M = Ca , Sr or Ba) then air-fired at 950 °C for 2 hours. The samples thus obtained are investigated by X-Ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). Dielectric measurements are performed from -150 °C up to 200 °C in the frequency range 20-10⁵ Hz.

Each ceramic is a perovskite single phase and the relative density reaches 95% for all the ceramics. The addition of 3 mol % of the eutectic composition 1MF₂-4LiF to SrTiO₃ lowers the sintering temperature of pure strontium titanate from 1400 °C to 950 °C and induces a strong modification in the SrTiO₃ cubic phase : superlattice reflections are detected with an orthorhombic symmetry. The dielectric permittivity shows no maximum in the temperature range investigated.