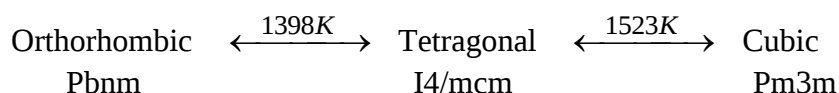


STRUCTURAL PROPERTIES AND PHASE TRANSITIONS IN $\text{Ca}_{1-x}\text{Sr}_x(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$ CERAMICS

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Perovskite oxides ABO_3 have numerous properties and are attractive materials for several applications. Derived BaTiO_3 or SrTiO_3 compounds have stimulated many investigations. On the contrary, only few studies are known on derived CaTiO_3 materials. Calcium titanate undergoes two phase transitions:



The aim of this work is to determine the effect of the fluorides SrF_2 and LiF on the properties of CaTiO_3 . Various compositions $(1-x) \text{CaTiO}_3 + x \text{SrF}_2 + x \text{LiF}$ are prepared and heated at 1223 K for 4 hours. X-ray diffraction (XRD) analysis are carried out to control the purity and to identify the different phases. A new solid solution with general formula $\text{Ca}_{1-x}\text{Sr}_x(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$ occurs in the range $0 \leq x \leq 0.3$. The XRD patterns show each sample to have an orthorhombic symmetry at room temperature.

The ceramic microstructure is systematically characterized by a scanning electron microscopy observation performed on fractured samples. The grain average sizes are about 1 – 1.5 μm . DSC measurements are performed from 303 K up to 873 K. Three phase transitions are observed for each sample. As example, these thermal phenomena appear respectively at $T_1 = 552$ K, $T_2 = 683$ K and $T_3 = 823$ K for ceramic $\text{Ca}_{0.95}\text{Sr}_{0.05}(\text{Ti}_{0.95}\text{Li}_{0.05})\text{O}_{2.85}\text{F}_{0.15}$.

These new oxifluorides may be promising materials in the fabrication of numerous microelectronic devices.