

# LOW TEMPERATURE PREPARATION AND PROPERTIES OF CERAMICS WITH COMPOSITION $\text{Ca}_{1-x}\text{Pb}_x(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$

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Calcium titanate  $\text{CaTiO}_3$  belongs to the class of perovskite oxides  $\text{ABO}_3$  which are intensively studied worldwide thanks to their large range of applications in various devices. This material stand out for its tendency to form a lot of solid solutions with lanthanides and therefore is well known since a longer time for the treatment and the storage of radioactive wastes. Actually, there are several experimental findings for this perovskite in the field of hydrocarbons catalysis, electronics, optical or biomedical applications. This work is focussed on the study of  $\text{CaTiO}_3$  -  $\text{PbF}_2$  -  $\text{LiF}$  system at low temperature to get new oxifluorides related to calcium titanate

Powder of  $\text{CaTiO}_3$  is previously synthesized by solid state reaction. Fluorinated ceramics deriving from  $\text{CaTiO}_3$  are then sintered at low temperature with the aid of the fluoride mixture  $\text{PbF}_2 + \text{LiF}$ . The XRD patterns of the samples show the formation of a novel solid solution  $\text{Ca}_{1-x}\text{Pb}_x(\text{Ti}_{1-x}\text{Li}_x)\text{O}_{3-3x}\text{F}_{3x}$  in the composition range  $0 \leq x \leq 0.125$  mol. %.

SEM observations are performed on fractured ceramics and DSC analyses are carried out from room temperature up to 600 °C. Three second order phase transitions are detected for all the samples.

Capacitors are prepared from the pre-sintered ceramics then dielectric measurements are performed as a function of temperature in the frequency range  $10^2$  Hz -  $4 \times 10^7$  Hz. The  $\epsilon'_r$  - T curves exhibit the profile of class I capacitors, however the values of  $\tan \delta$  are too high.