DIELECTRIC AND DIFFERENTIAL SCANNING CALORIMETRY INVESTIGATIONS IN (1-x)$SrTiO_3$ - xSrF_2 – xLiF CERAMICS (x = 0.05; x = 0.10)

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The modern industry needs more and more new type materials with interesting dielectric, electrical and optical characteristics, depending on the starting compounds and preparation methods. Thanks to their huge range of properties, the family of perovskite oxide ABO_3 is one of the most promising candidates materials for potential applications in several electronic systems and computer industry. Strontium titanate $SrTiO_3$ is a well known quantum paraelectric with a cubic symmetry at room temperature. This perovskite exhibits an antiferrodistortive phase transition at around 110 K. In earlier works, we have synthesized a novel solid solution $Sr(Ti_{1-x}Li_x)O_{3-3x}F_{3x}$ ($0 \leq x \leq 0.40$). The aim of the present study is to investigate the phase transitions in (1-x)$SrTiO_3$ - xSrF_2 - xLiF compounds (x = 0.05; x = 0.10).

$SrTiO_3$ is previously prepared at 1373 K. Two ceramics with initial composition (1-x)$SrTiO_3$ + xSrF_2 + xLiF (x = 0.05; x = 0.10) are then sintered at 1223 K for 2 hours. The phase transitions in the obtained oxifluorides are investigated by dielectric measurements (DE) and differential scanning calorimetry (DSC). The DE measurements are performed as a function of temperature (300 K $\leq$ T $\leq$ 800 K) or frequency (100 Hz $\leq$ f $\leq$ 40 MHz). DSC analyses are carried out between 300 K and 870 K. Three phenomena, which could be attributed to second order phase transitions, are detected. The frequency dependence of the complex permittivity shows a dielectric dispersion. The real permittivity is practically stable over a large range of temperature and frequency. The investigated ceramics could be of interest for the fabrication of type I capacitors.

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