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Dielectric and ferroelectric properties of PZN-4.5PT thin films on nanostructured silicon substrate

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Ferroelectric lead compounds having a perovskite structure, such as $\text{Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ (PZN) [1], $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ (PMN) [2], and their solid solutions with PbTiO_3 (PT), have been investigated for high-performance ultrasonic transducer applications [3-4]. The integration of such materials as thin films have attracted considerable attention these last years thanks to their outstanding performances that allow to consider new features for the realization of photovoltaic device. Ferroelectric thin films, especially those derived from BaTiO_3 composition, have been studied for about thirty years for microelectronics, telecommunications and optics applications. For most applications, it is necessary to approach the single crystal in a thin layer, in order to limit losses (dielectric, optical ...). The advantage of thin films relative to the solid material is then multiple: ability to embed on microcircuits, lower cost than single crystals and geometry for new efficient designs. PZN-4.5PT thin films properties, or ferroelectric materials in general, change significantly with the structural and constitutive properties of considered material. Thus, to consider their integration in applications such as microsystems, it is essential to determine beforehand the influence of these parameters on the electrical performance of the studied materials.

Our study focuses to investigate structural, dielectric and ferroelectric properties of PZN-4.5PT nanoparticles thin films on Silicon substrate.

Keywords: perovskite, nanoparticles, thin film.

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