

Size effects on $\text{Pb}_{0.5}\text{Ca}_{0.5}\text{TiO}_3$ thin films

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Recent experimental finds on calcium lead titanate thin films, $\text{Pb}_{1-x}\text{Ca}_x\text{TiO}_3$, with $x = 0.5$ reported by the authors [1,2] deal with their probably relaxor character and the coexistence of a mixture of orthorhombic, Pbnm, and tetragonal, P4mm, phases. Based on this knowledge, $\text{Pb}_{0.5}\text{Ca}_{0.5}\text{TiO}_3$ thin films with different thickness have been prepared by deposition of sol-gel precursor solutions onto Pt/TiO₂/SiO₂/(100)Si substrates and crystallized by a rapid thermal processing (RTP). Dielectric measurements with temperature and frequency, and AFM micrographs have been performed. Two maxima are detected in the curve of variation of permittivity with temperature (K'-T), which are clearly observed in the thinner films. The AFM images of the films surfaces shows a non - dependence of the mean grain size (~ 50 nm) with the film thickness. Furthermore, relaxor - like properties are dependent on the film heterostructure (film thickness). The analysis of the experimental results and dielectric anomalies observed is discussed in terms of the possible existence of a morphotropic phase boundary (MPB) and strain/stress generated during their processing-

[1] R. Jiménez, C. Alemany, M. L. Calzada and J. Mendiola. "Relaxor - Like Behaviour of $\text{Pb}_{0.5}\text{Ca}_{0.5}\text{TiO}_3$ thin films". *Ferroelectrics*. In press.

[2] I. Bretos, J. Ricote, R. Jiménez, J. Mendiola and M.L. Calzada. "Processing of chemical solution deposited Ca-modified PbTiO_3 films for high frequency components and dynamic random access memories" *Integrated Ferroelectrics*. In press.