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Epitaxial strain and phase separation in $La_{0.7}Ca_{0.3}MnO_3$ manganite V. PEÑA, GFMC. Depto. Fisica Aplicada III. U. Complutense, M. VARELA, Condensed Matter Sciences Div. Oak Ridge National Lab. Oak Ridge TN 37831-6031 USA, Z. SEFRIOUI, D. ARIAS[1], C. LEON, GFMC. Depto. Fisica Aplicada III. U. Complutense, M. GARCIA-HERNANDEZ, Instituto de Ciencia de Materiales de Madrid. ICMM- CSIC. 28049 Cantoblanco. Spain, S.J. PENNYCOOK, Condensed Matter Sciences Div. Oak Ridge National Lab. Oak Ridge TN 37831-6031 USA, J. SANTAMARIA, GFMC. Depto. Fisica Aplicada III. U. Complutense
— Epitaxial strain has been explored as a method of tailoring structural distortions to examine their influence on physical properties of thin films of colossal magnetoresistance manganites. However depressed saturation magnetizations have been found in nanometer thick samples both for tensile and compressive in plane strains, and a clear picture of the effect of strain on the phase separation picture has not emerged yet. In this paper we present results of ultrathin $La_{0.67}Ca_{0.33}MnO_3$films grown on $SrLaAlO_4$ (a=0.375 nm) under high in plane compressive strain (-3.1 %). We show 2D dimensional epitaxial growth below the critical thickness what allows exploring the effect of lattice distortions on the PS in highly ordered films with thickness in the 2 - 6.5 nm range. Aberration corrected scanning transmission electron microscopy (STEM) with atomic resolution combined with energy loss spectroscopy are used to show evidence for strain induced nanoscale phase separation.

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