Abstract Submitted
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Control of the magnetic properties of $LaMnO_3$ epitaxial thin films grown by Pulsed Laser Deposition[1] BENJAMIN MARTINEZ, ICMAB - CSIC, JAUME ROQUETA, ICN2, Institut Catala de Nanociencia I Nanotecnologia, ALBERTO POMAR, LLUIS BALCELLS, CARLOS FRONTERA, ZORICA KONSTANTINOVIC, FELIP SANDIUMENGE, ICMAB - CSIC, JOSE SANTISO, ICN2, Institut Catala de Nanociencia I Nanotecnologia, ADVANCED MATERIALS CHARACTERIZATION TEAM, THIN FILMS GROWTH TEAM — $LaMnO_3$ (LMO), the parent compound of colossal magnetoresistance based manganites has gained renewed attention as a building block in heterostructures with unexpected properties. In its bulk phase, stoichiometric LMO is an A-type antiferromagnetic (AFM) insulator (T_N =140K) with orthorhombic structure that easily accommodate an oxygen excess by generating cationic (La or Mn) vacancies. As a result, a fraction of Mn $^{3+}$ changes to Mn $^{4+}$ leading to a double-exchange mediated ferromagnetic (FM) behavior. In thin films the AFM phase has been elusive up to now and thin films with FM ordering are usually reported. In this work, we have systematically studied the growth process of $LaMnO_3$ thin films by pulsed laser deposition on $SrTiO_3$ (001) substrates under different oxygen partial pressures (PO_2). A close correlation between the structure (explored by XRD) and the magnetic properties (SQUID measurements) of the films with PO_2 has been identified. At high PO_2 FM behavior is observed. In contrast, at very low PO_2, the results obtained for unit cell volume (close to stoichiometric bulk values) and magnetic moment (0.2 μ_B/Mn) strongly indicate antiferromagnetic ordering.

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