Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Influence of Oxygen Pressure during Deposition on Atomic-Scale Surface Features of $La_{5/8}Ca_{3/8}MnO_3$ Films[1] A. TSELEV, R.K. VASUDEVAN, ORNL, Oak Ridge, TN, USA, A. GIANFRANCESCO, ORNL/University of Tennessee Knoxville, TN, USA, L. QIAO, P. GANESH, T.L. MEYER, H.-N. LEE, M.D. BIEGALSKI, A.P. BADDORF, S.V. KALININ, ORNL, Oak Ridge, TN, USA — We have used *in situ* scanning tunneling microscopy to visualize atomic-scale surface structure of a mixed-valence manganite $La_{5/8}Ca_{3/8}MnO_3$ films grown by pulsed laser deposition. Surface termination and chemical composition were identified *in situ* with angle-resolved x-ray photoelectron spectroscopy. We find a strong effect of the background oxygen pressure during deposition on structural and chemical features of the film surface. Deposition at 50 mTorr leads to mixed-terminated films with atomic-scale structurally imperfect B-site (MnO_2) termination. A small reduction of the pressure from 50 mTorr to 20 mTorr results in a dramatic change of the atomic-scale surface structure. The surface is dominated by nearly perfectly ordered B-site termination. However, this was accompanied by surface roughening at a mesoscopic length scale with formation of mound-like structures. These results can be interpreted as a strong influence of oxygen on the adatom mobility during growth. The effect of the oxygen pressure on dopant surface segregation is also noticeable: Ca surface segregation is reduced with decrease of the oxygen pressure.

[1]This research was sponsored by DMSE, BES, U. S. DOE. Research was conducted at CNMS, which also provided support and which is sponsored at ORNL by SUFD, BES, U. S. DOE.

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Date submitted: 14 Nov 2014 Electronic form version 1.4