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Growth and characterization of multiferroic $BiMnO_3$ thin films[1]

AMLAN BISWAS, G. SINGH-BHALLA, CHELSEY MORIEN, HYOUNG JEEN JEEN, PATRICK MICKEL, SEFAATIN TONGAY, JULIA NEFF, A. F. HEBARD, Department of Physics, University of Florida, Gainesville, FL 32611 — $BiMnO_3$ is a rare single phase, multiferroic compound which displays both ferromagnetic and ferroelectric properties. However, it is complicated to grow thin films of $BiMnO_3$due to the volatility of bismuth and substrate induced strain. We have grown thin films of $BiMnO_3$ on $SrTiO_3$ (100) substrates using pulsed laser deposition. These films have a ferromagnetic T_C of about 95 K and electric polarization vs. electric field curves have confirmed their ferroelectric properties. The structure and chemical composition of these thin films have been characterized using x-ray diffraction, atomic force microscopy, scanning electron microscopy, and Auger electron spectroscopy. We will present evidence of the sensitivity of the multiferroic properties of $BiMnO_3$ thin films to the growth conditions and substrate induced strain.

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