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Epitaxial growth of polar magnetic $PbVO_3$ thin films on $LaAlO_3$ substrates R.H. SHIN, S.H. OH, W. JO[1], Department of Physics, Ewha Womans University, Seoul, 120-750, Korea, Y.-S SEO, J.S. AHN, Department of Physics, Pusan National University, Pusan 609-735, Korea — Layered perovskite $PbVO_3$ (PVO) is a curious polar magnetic material, which has a potential of room temperature multiferroics. A sintered $PbVO_x$ ceramic target was prepared for pulsed-laser deposition. To obtain a stoichiometric single-phase $PbVO_3$ thin-film, it is known that control of oxygen partial pressure during the deposition is critical. With a base pressure of 10^{-6} Torr, the deposition pressure was maintained as low as 10^{-5} Torr, which is a severe reducing condition for most of oxide thin-films. We used $LaAlO_3$(001) substrates, of which lattice constant is 0.379 nm. Substrate temperature was changed from 450 to 650°C. X-ray diffraction studies show that all the films show (001) oriented $PbVO_3$ growth but parasitic peaks are found near 39 and 42°, which are presumably linked with the chervetite $Pb_2V_2O_7$ phase. In addition, the c-axis lattice constant of the $PbVO_3$ cell is decreasing and the grain size becomes bigger as the growth temperature increases. Microscopic analysis and optical measurements have been performed to investigate their local structures. However, the plume in the low pressure would generate a disperse shape of ablated ions and molecules. We will discuss how to improve the structure of the films via a new set of process parameters and their electrical properties including polarization switching and charge conduction.

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