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Implication of structural changes to ferroelectrity in epitaxially grown PbVO3 thin films SEOL HEE OH, HYE-JIN JIN, RAN HEE SHIN, WILLIAM JO, Ewha Womans University, YU-SEONG SEO, JAI-SEOK AHN, Pusan National University — PbVO3 (PVO) having a perovskite-type tetragonal structure is an intriguing polar magnetic material because its structural distortion would be linked to enhanced ferroelectric polarization and considered as a candidate of multiferroic materials. However, ferroelectricity of PVO is not experimentally demonstrated yet as a form of thin-films partly due to its large tetragonality (c/a=1.23) compared with proper ferroelectric PbTiO3 (c/a = 1.06) [1]. Polarization of PVO is generated by lone pair of Pb2+ ions and estimated to $\sim$ 152 μC/cm2 [3]. We used laser ablation to synthesize epitaxial PVO thin films on LaAlO3 (001) substrates under argon ambient from a stable Pb2V2O7 sintered target. X-ray diffraction was used to investigate the phase formation and texture of the films. Only under an optimized condition with no oxygen partial pressure, epitaxial growth of the PVO films was possible. We confirmed four-fold symmetry of in-plane alignment of the films on PbVO3 [001] // LaAlO3 [001], but the a- and c- lattice constants of the PVO films show changes due to the compressive stress from the substrates. In addition, surface morphology of the films displays drastic changes in accordance with the growth conditions. Some elongated grains are related to the Pb2V2O7 pyrochlore structure. The relation between structural deformation and ferroelectricity in the PVO films was examined by local measurement of piezoresponse force microscopy.

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