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Molecular Beam Epitaxy of MgO on Perovskite Substrates M. SNYDER, J. XU, Engineering Science and Mechanics, Pennsylvania State University, P. FISHER, M. SKOWRONSKI, P. SALVADOR, Materials Science and Engineering, Carnegie Mellon University, O. MAKSIMOV, V. HEYDEMANN, Electro-Optics Center, Pennsylvania State University — Rock salt oxides are promising interface layer materials for the integration of multifunctional oxides with semiconductors (Si, SiC, and GaN). Although rock salt oxides were previously grown on a wide range of semiconductor (Si and GaAs) and oxide ($LaAlO_3$ and $SrTiO_3$) substrates, the influence of lattice mismatch on the crystalline quality of the films was not studied. MgO thin films were grown by molecular beam epitaxy on LSAT, $LaAlO_3$ and $SrTiO_3$ perovskite substrates to investigate the effects of lattice mismatch on the film crystal quality. Despite a lattice mismatch of ∼7.9% and ∼9%, respectively, epitaxial growth of MgO was achieved on $SrTiO_3$ and LSAT substrates. Films grown on $LaAlO_3$ substrates exhibiting a lattice mismatch of ∼10.5% were polycrystalline, yet epitaxial MgO on $LaAlO_3$ was deposited after the introduction of a $SrTiO_3$ buffer layer. The effects of deposition rate, substrate temperature, ozone flux, $SrTiO_3$buffer layer thickness and stoichiometry were also investigated. This work was supported by the Office of Naval Research under grants N00014-05-1-0238 and N00014-06-1-1018.

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