Abstract Submitted
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Structural and electrical properties of crystalline $LaAlO_3$ on Silicon (100)[1] JAMES REINER, AGHAM POSADAS, Applied Physics, Yale University, MIAOMIAO WANG, T.P. MA, Electrical Engineering, Yale University, CHARLES AHN, Applied Physics, Yale University — $LaAlO_3$ (LAO) is a promising gate insulator material for use in future generations of silicon technology because of its relatively large dielectric constant (24) and band gap (5.5 eV). The growth of crystalline LAO on silicon is impeded, however, by interface reactions. To overcome this difficulty, we have deposited epitaxial LAO on silicon (100) surfaces by using a 2 monolayer crystalline $SrTiO_3$ transition layer. The growth was performed by oxide molecular beam epitaxy. The crystallinity of the structure was confirmed by in situ reflection high energy electron diffraction (RHEED), and also x-ray diffraction and transmission electron microscopy (TEM). Cross-sectional TEM shows no SiO_2 at the complex oxide-silicon interface. Metal-oxide-semiconductor (MOS) capacitors have been fabricated and measured (I-V and C-V characteristics). Inelastic electron tunneling spectroscopy (IETS) measurements have been carried out on these MOS capacitors, which also indicate the absence of SiO_2 at the interface.

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