The role of defects in the electrical properties of NbO$_2$ thin film vertical devices$^1$ TOYANATH JOSHI, West Virginia University, PAVEL BORISOV, Loughborough University, DAVID LEDERMAN, University of California, Santa Cruz — Epitaxial NbO$_2$ thin films were grown on Si:GaN layers deposited on Al$_2$O$_3$ substrates using pulsed laser deposition. Pulsed current-voltage (IV) curves and self-sustained current oscillations were measured across a 31 nm NbO$_2$ film and compared with a similar device made from polycrystalline NbO$_2$ film grown on TiN-coated SiO$_2$/Si substrate. Crystal quality of the as grown films was determined from x-ray diffractometric, x-ray photoelectron spectroscopy and atomic force microscopy data. The epitaxial film device was found to be more stable than the defect-rich polycrystalline sample in terms of current switching and oscillation behaviors.

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