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Electrical field induced Metal-Insulator Transition in NbO_2 thin films at room temperature YUHAN WANG, STUART WOLF, JIWEI LU, Univ of Virginia — Highly correlated oxides that exhibit a metal to insulator transition (MIT) are of great interest because of their potential application to high performance switches. NbO_2 exhibits a MIT at 1081K accompanied by a structural transformation from rutile to a distorted variant, which makes it a potential candidate for the switching applications. By a reactive bias target ion beam deposition (RBTIBD) growth technique, we have obtained crystalline single phase NbO_2 thin films grown on Al_2O_3 (0001), $Au/Al_2O_3(0001)$, and $Pt/Al_2O_3(0001)$ substrates. AFM, XRD and Raman spectroscopy were used to characterize the morphology and microstructure of the NbO_2 films. We have observed electrically induced transitions from the insulating to the metallic state with two orders of magnitude change in the resistivity at room temperature. This transition occurred at an electric field between 30-100 kV/cm. We will discuss the possible mechanisms for this induced MIT.

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