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**Ellipsometric Study of $NbO_2$ Grown by MBE on LSAT from 77 to 800 K** T.N. NUNLEY, S. ZOLLNER, NMSU, T. HADAMEK, A.B. POSADAS, A. O'HARA, A.A. DEMKOV, UT Austin — $NbO_2$ is a transition metal oxide that has been of interest for several decades. Like other complex oxides it has a metal-insulator transition provoked by external stimuli such as temperature, pressure, and electric fields. Our study shows the dielectric function of $NbO_2$ grown by molecular beam epitaxy, optical axis in-plane, on $(LaAlO_3)_{0.3}$ $(Sr_2AlTaO_6)_{0.35}$ (LSAT) substrates. The ellipsometric angles were measured from 0.76 to 6.52 eV using a UV/VIS variable-angle spectroscopic ellipsometer and from 250 to 1200 $cm^{-1}$ using an FTIR ellipsometer. By using regression analysis we modeled our optical spectra with one model over the entire range from the mid-infrared to the near UV. For the LSAT substrate, we used optical constants from a previous study. A sum of Tauc-Lorentz oscillators describes the dielectric function of the $NbO_2$ film. We have measured the dielectric function of the sample from 77-800 K. This has allowed us to see that the absorption peaks sharpen/broaden with decreasing/increasing temperature. We have also plotted the direct and indirect band gaps as a function of temperature.

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