

342. Title:Terahertz spectroscopy studies on epitaxial vanadium dioxide thin films across the metal-insulator transition

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Abstract:We present results on terahertz (THz) spectroscopy on epitaxial vanadium dioxide (VO₂) films grown on sapphire across the metal-insulator transition. X-ray diffraction indicates the VO₂ film is highly oriented with the crystallographic relationship: (002)_{film}//(0006)_{sub} and [010]_{film}//[21 $\bar{1}$ 0]_{sub}. THz studies measuring the change in transmission as a function of temperature demonstrate an 85% reduction in transmission as the thin film completes its phase transition to the conducting phase, which is much greater than the previous observation on polycrystalline films. This indicates the crucial role of microstructure and phase homogeneity in influencing THz properties.