

Abstract Submitted
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Vanadium dioxide thin films prepared on silicon by low temperature MBE growth and ex-situ annealing¹ PIA HOMM, BART VAN BILZEN, MARIELA MENGHINI, JEAN-PIERRE LOCQUET, KU Leuven, TODORA IVANOVA, LUIS SANCHEZ, PABLO SANCHIS, Universidad Politecnica de Valencia — Vanadium dioxide (VO_2) is a material that shows an insulator to metal transition (IMT) near room temperature. This property can be exploited for applications in field effect devices, electro-optical switches and nonlinear circuit components. We have prepared VO_2 thin films on silicon wafers by combining a low temperature MBE growth with an ex-situ annealing at high temperature. We investigated the structural, electrical and optical characteristics of films with thicknesses ranging from 10 to 100 nm. We have also studied the influence of the substrate cleaning. The films grown with our method are polycrystalline with a preferred orientation in the (011) direction of the monoclinic phase. For the films produced on silicon with a native oxide, an IMT at around 75 °C is observed. The magnitude of the resistance change across the IMT decreases with thickness while the refractive index at room temperature corresponds with values reported in the literature for thin films. The successful growth of VO_2 films on silicon with good electrical and optical properties is an important step towards the integration of VO_2 in novel devices.

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