

Topic: Growth of pristine/ doped TiO₂ thin films through MBE and studying its microstructural, Optical and Magnetic Properties

Literature survey has been done for the growth of pristine TiO₂ thin film through Molecular Beam Epitaxy (MBE) . It has several parameters which has to be taken under consideration. Molecular beam epitaxy takes place in high vacuum or ultra-high vacuum (10^{-8} - 10^{-12} Torr). The most important aspect of MBE is the deposition rate (typically less than 3000 nm per hour) that allows the films to grow epitaxially. These deposition rates require proportionally better vacuum to achieve the same impurity levels as other deposition techniques. The absence of carrier gases as well as the ultra high vacuum environment result in the highest achievable purity of the grown films. I got trained on the growth process of thin films through MBE technique and prepared my TiO₂ thin film of 5nm thickness through MBE. Now I will be getting trained on the characterization techniques like XRD(X ray Diffractometer) and AFM(Atomic Force Microscopy). X-ray powder diffraction (XRD) is a rapid analytical technique primarily used for phase identification of a crystalline material and can provide information on unit cell dimensions. Atomic-force microscopy (AFM) is a type of scanning probe microscopy (SPM), with demonstrated resolution on the order of fractions of a nanometer, more than 1000 times better than the optical diffraction limit.