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Molecular Beam Epitaxial growth of Pristine and Cobalt doped Anatase TiO_2 thin films and their Enhanced Magnetic and Optical properties[1] SWALEHA NASEEM, Z.H. College of Engg. Tech., Aligarh Muslim University, IGOR V. PINCHUK, ADAM S AHMED, YUNQIU KELLY LUO, ROLAND KAWAKAMI, The Ohio State University, WASI KHAN, Aligarh Muslim University, SHAKEEL KHAN, ALIM H. NAQVI, Z.H. College of Eng. Tech., Aligarh Muslim University, KAWAKAMI GROUP COLLABORATION — The epitaxial growth of pristine and Cobalt doped Anatase TiO_2 ($Ti_{1-x}Co_xO_2$, $0.02 \leq x \leq 0.08$) on $LaAlO_3$ (100) has been carried out with goal of getting enhanced magnetic and better optical properties with good structural quality. We have grown pristine and cobalt doped anatase TiO_2 thin films with MBE showing good crystalline nature as depicted by the RHEED images with slow growth rate taken over a substrate temperature of 600- 650C on $LaAlO_3$ (100). Films were grown in the presence of molecular oxygen while previously reported growth of these oxide films were with OPAMBE or by using ozone flux. Formation of smooth and single phase crystalline nature of the thin film is confirmed by XRD and AFM, EDS. Enhanced magnetism due to oxygen vacancies and doping of Co in the host lattice which is measured by SQUID and the temperature dependent magnetic measurements predicts the curie temperature just above the 300K. The photoconductivity measurements of these thin films gives the photosensitization of anatase titania with transition metal dopants.

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