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Magnetic anisotropy dependency on structural properties in strained MnAs thin films MAGNUS WIKBERG, Dep. Eng. Sciences, Uppsala University, MIKAEL OTTOSON, Dep. Materials Chemistry, Uppsala University, JANUSZ SADOWSKI, MAX-Lab, Lund University, RONNY KNUT, OLOF KARIS, Dep. Physics and Materials Science, Uppsala University, PETER SVEDLINDH, Dep. Eng. Sciences, Uppsala University — High quality thin films of MnAs (between 30 and 200 Å) have been grown with molecular beam epitaxy (MBE) on GaAs(111)B and (001) substrates and under different growth conditions. The magnetic anisotropy of the MnAs layers has been investigated with SQUID magnetometry and magnetic force microscopy (MFM). A clear correlation between choice of substrate, growth temperature and film thickness can be seen in the magnetic anisotropy and T_c measurements with a rapid transition towards bulk like anisotropy constants as the film thickness is increased. From X-ray diffraction, a relationship between T_c and lattice strain has been established, where the film with increasing film thickness rapidly exhibits a transition from a highly strained to a fully relaxed film. A complex dependence on the structural transition from the ferromagnetic to the paramagnetic phase is also seen in X-ray magnetic circular dichroism (XMCD) measurements, where the orbital moment does not strictly follow the spin moment near the ferromagnetic-paramagnetic phase transition.

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