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Study of the correlation between structural and magnetic properties of MnAs/Si S. HEGDE, J. KWON, E. FRASER, H. LUO, Department of Physics, University at Buffalo, SUNY, D.H. LEE, C.R. WIE , Department of Electrical Engineering, University at Buffalo, SUNY, LUO COLLABORATION, WIE COLLABORATION — Ferromagnetic MnAs, has been widely studied because of its ferromagnetic properties and structural compatibility with conventional semiconductors. Magnetic properties of MnAs grown on Si(001) vary depending upon the growth conditions. To understand the variations, we carried out experiments using X-ray diffraction, atomic force microscopy (AFM) and magnetic force microscopy (MFM), together with magnetization measurements. For this study, MnAs was grown by molecular beam epitaxy (MBE) on Si(001) and Si(111) substrates. The surface structure of MnAs is correlated with the magnetic properties. For samples with no in-plane anisotropy, both AFM and X-ray diffraction measurements show the coexistence of MnAs with orthogonal orientations. The magnetic domains are very different from those observed in MnAs grown on GaAs (001). Significant differences in surface morphology are observed between MnAs layers grown on Si(001) and Si(111) because of the different orientations of MnAs .

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