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Epitaxial growth of half metal thin films on GaAs(100) for spin injection Y. L. HSU, Y. H. CHIU , Y. LIN, J. KWO, Dept. of Phys., National Tsing Hua Univ., Hsinchu, Taiwan , P. CHANG, Y. L. HUANG, M. L. HUANG, Y. J. LEE, K. Y. LEE, W. G. LEE, M. HONG, Dept. of Mat. Sci. and Eng., National Tsing Hua Univ., Hsinchu, Taiwan — We report epitaxial thin films of half metal Fe_3O_4 and Fe_3Si on the GaAs(100) buffer layer grown by *in-situ* MBE method. With only one spin band at E_F, half metals are 100% spin polarized and are considered as an ideal candidate for spin injection. Fe_3Si is a ferromagnet with a T_c of 840K, and a cubic DO_3 structure almost perfectly lattice matched to GaAs (100) surface. Preliminary RHEED studies showed the attainment of (100) FeO_x thin films epitaxially grown on (100) GaAs with an in-plane 45° rotation in matching the major crytstallographic axes. The crystallinity of FeO_x depends significantly on oxygen partial pressure during growth, film thickness, and the surface may undergo decomposition during cooling process. The chemical composition of the FeO_x film was determined by XPS analysis by fitting the Fe 2p spectrum with two components of Fe^{2+} and Fe^{3+}. Low temperature magnetic and electrical transport measurements are now underway.

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