

Structural properties of Lithium Ferrite thin films: Low temperature growth and effect of lattice mismatch.

Cihat Boyraz, Dipanjan Mazumdar, Milko Iliev, Jianxing Ma, Srinivasan Gopalan, and Arunava Gupta

Lithium ferrite (LiFe_5O_8 , LFO) is an attractive material for a range of application, including planar microwave devices and even in emerging areas such as spintronics. This is due to its relatively high room temperature magnetization and very high Curie temperature. LFO thin films were deposited on substrates with various degree of lattice mismatch (0 0 1)-oriented SrTiO_3 (STO, -6.5% lattice mismatch), MgAl_2O_4 (MAO, -3.1%) and MgO (+0.7 %) by the pulsed laser deposition technique over a wide temperature window (200-700C) at relative low oxygen pressure with 5-10% ozone. This condition is believed to lead to a robust growth of spin ferrite films [1]. Epitaxy was obtained in samples grown at as low as 400C but film epitaxy and surface morphology enhanced with better lattice-match, with films grown on MgO showing the best properties.

References

[1] J.X.Ma, D.Mazumdar, G.Kim, H.Sato, N.Bao, A. Gupta, submitted to J. Appl. Phys , submitted to J. Appl. Phys (Also at <http://arxiv.org/abs/1006.1161v1>)

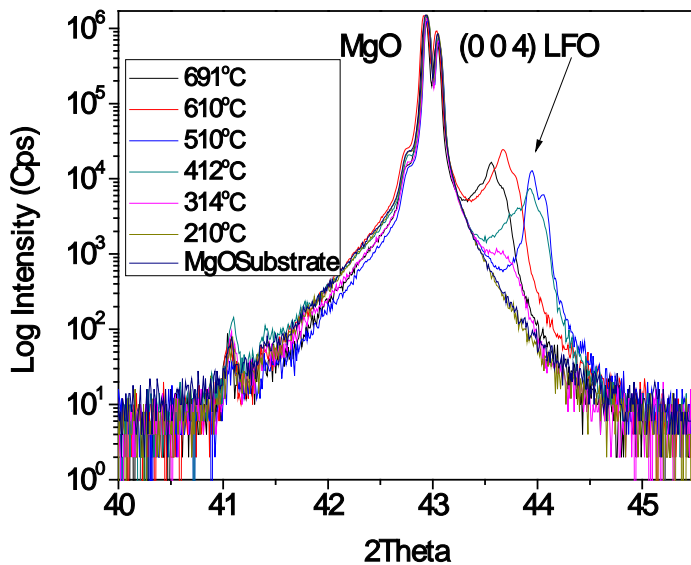


Figure caption: X-Ray diffraction pattern of LFO films grown on MgO at different growth temperatures.