

Abstract Submitted
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Effects of preparation conditions on the physical properties of nickel ferrite thin films¹ HILLARY BELLIVEAU, MANUEL BONILLA, PATRICK MCARDLE, CASEY MILLER, Univ of South Florida — The effects of the deposition temperature, pressure, and oxygen partial pressure were investigated on the structural, electrical, and magnetic properties of nickel ferrite (NiFe_2O_4) thin films grown by magnetron sputtering. The samples were grown on Si (100), Si (100) with 500nm of amorphous SiO_2 , and on MgO (100) substrates. Increasing the deposition temperature allowed the NiFe_2O_4 (004) XRD peak to appear at higher oxygen partial pressures. Between films of the same oxygen pressure, increasing the deposition temperature reduced the FWHM and increased the intensity of the NiFe_2O_4 (004) XRD peak. The films were 800 to 1000nm thick as measured by profilometry. Increasing the oxygen partial pressure reduces the intensity of the (004) NiFe_2O_4 XRD peak, and allows us to tune the material from a conducting material ($\rho = 114$ microOhm*cm at $T=220\text{K}$) to an insulating one ($\rho = 2475$ Ohm*cm at $T=220\text{K}$). The resistivity at 220K decreased as the deposition temperature was increased for films grown at the same oxygen partial pressure. The magnetic properties were investigated with magneto-optical Kerr effect and vibrating sample magnetometry.

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Hillary Belliveau
Univ of South Florida

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