

Structural and magnetic properties of epitaxial $\text{FeMn}_2\text{O}_{4\pm\delta}$ film on $\text{MgO}(100)$

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FeM_2X_4 spinel structures, where M is a transition metal and X is oxygen or sulfur, are candidate materials for spin filters, one of the key devices in spintronics. On the other hand, the electronic and magnetic properties of these spinel structures could be modified via the control of cation distribution. Among the spinel oxides, iron manganese oxide is one of promising materials for applications. $\text{FeMn}_2\text{O}_{4\pm\delta}$ shows inverse spinel structure above 390 K and ferrimagnetic properties below the temperature. In this work, we report on the structural and magnetic properties of epitaxial $\text{FeMn}_2\text{O}_{4\pm\delta}$ thin film on $\text{MgO}(100)$ substrate. The reflection high energy electron diffraction (RHEED) and X-ray diffraction (XRD) results indicated that films were epitaxial grown on $\text{MgO}(100)$ without the impurity phases. The valance states of Fe and Mn in the $\text{FeMn}_2\text{O}_{4\pm\delta}$ film were carried out using x-ray photoelectron spectrometer (XPS). The magnetic properties were measured by vibrating sample magnetometer (VSM), indicating that the samples are ferromagnetic at room temperature. The structural detail and origin of magnetic ordering in $\text{FeMn}_2\text{O}_{4\pm\delta}$ will be discussed.