Abstract Submitted
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Magnetic and structural properties of half-metallic Sr_2FeMoO_6 epitaxial films fabricated by ultra-high vacuum sputtering[1] ADAM HAUSER, R.A. RICCIARDO, A. GENC, R.E. WILLIAMS, P.M. WOODWARD, H.L. FRASER, F.Y. YANG, The Ohio State University — Sr_2FeMoO_6, a double-perovskite half-metallic ferromagnet, has attracted much attention because of its high Tc of 420 K. However, the fabrication of Sr_2FeMoO_6 epitaxial films has been challenging due to impurity phases and disorder. Using ultrahigh vacuum off-axis RF sputtering with precisely controlled low-concentration H_2 in Ar, we have fabricated phase-pure Sr_2FeMoO_6 epitaxial films on $SrTiO_3$ (001) and (111) substrates. X-ray diffraction confirms pure phase with double perovskite ordering. The phase purity and magnetic moments are highly sensitive to the H_2 partial pressure. The optimal range for the H_2 concentration is 0.4% to 0.6% in Ar with 70 mTorr total pressure. The saturation magnetization of the Sr_2FeMoO_6 films grown in this range is 1.5 μ_B per formula unit at 5 K, which is a strong magnetization considering the epitaxial strain. Aberration-corrected HAADF TEM images reveal atomically sharp interface between Sr_2FeMoO_6 and $SrTiO_3$.

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