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Strong Enhancement of Magnetization in Fully Strained $SrRuO_3$ films on Sr_2RuO_4 single crystal substrates SEUNGRAN LEE, Y.J. SHIN, M.C. LEE, C.H. SOHN, S.J. KANG, CCES-IBS & Seoul Nat'l Univ., M.S. ANWAR, Y. SUGIMOTO, S. YONEZAWA, Y. MAENO, Kyoto University, T.W. NOH, CCES-IBS & Seoul Nat'l Univ. — We have investigated epitaxal growth and magnetic properties of $SrRuO_3$ (SRO113) films on single crystal Sr_2RuO_4 (SRO214) substrates. X-ray diffraction shows only SRO113(00l) peaks indicating epitaxial deposition; rocking scan at SRO112(002) exhibits a sharp curve with a full width at half maximum of $<0.05^\circ$ implying high crystallinity of our films. Transmission electron microscopy further verifies fully strained of SRO113 films with sharp interface. Surprisingly, the magnetic properties of SRO113/SRO214 show strong enhancement of magnetization (M >3 μ_B/Ru), which has never found SRO113(001) material systems. In addition, the Curie temperature of our films is identical to that of a bulk SRO113. Magnetic properties of SRO113 films are known to decrease under strain, attributed to RuO6 octahedral distortion. In comparison with varying strain of SRO113 films employing various perovskite substrates, we also found such enhancement is not coming from strain effect; M does not exceed 2 μ_B/Ru consistent with previous results due to the low spin configuration nature of SRO113. Possible origins of unique magnetic properties of SRO113/214 will be further discussed.

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