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4d electron Ruthenate systems: their unique and new magnetic properties SEUNGRAN LEE, YEONGJAE SHIN, CCES-IBS, Seoul 151-747, Republic of Korea, M.S. ANWAR, YUSUKE SUGIMOTO, Dept. of Physics, Graduate School of Science, Kyoto Uni., Kyoto 606-8502, MINCHEOL LEE, SUNGJIN KANG, CCES-IBS, Seoul 151-747, Republic of Korea, SHINGO YONEZAWA, YOSHITERU MAENO, Dept. of Physics, Graduate School of Science, Kyoto Uni., Kyoto 606-8502, TAEWON NOH, CCES-IBS, Seoul 151-747, Republic of Korea — The Ruddlesden-Popper series (PR) of $Sr_{n+1}Ru_nO_{3n+1}$ has attract much interest of their unique physical properties. Among them, $SrRuO_3$ (n = ∞) (SRO) is the only ferromagnetic metallic oxide especially in Ru $4d$ transition metal oxides. Bulk SRO has orthorhombic structure showing the Curie temperature (T_C) $\sim$ 160 K. It is well known that RuO_6 octahedral distortion plays critical roles in its mangetic properties. In film systems, such RuO_6 octahedra can be easily controlled by strain-engineering. In this talk, with high quality SRO films fully strained (-1.7%-1%) using various substrates, we systematically studied their structural changes and associated magnetic properties. Compared to theoretical predictions, the structural changes can be explained, while the magnetic property changes cannot be understood. Surprisingly, when SRO113 is grown on its PR series of Sr_2RuO_4 (n=1) (SRO214) single crystal, the exact substrate of SRO214 magnetization results in strongly enhanced magnetization (M ¿ 3 μ_B/Ru, T_C $\sim$ 160 K), which has never found SRO113 (001) since the low-spin configuration of SRO113 prevent M never exceed 2 μ_B/Ru. The mystery of M in SRO113 (especially SRO113/SRO214) will be further discussed.

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