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In-situ Surface X-ray Diffraction Study of Ruddlesden-Popper Series Thin Film Growth JUNE HYUK LEE, SEO HYOUNG CHANG, ZHENLIN LUO, Argonne National Laboratory, I-CHENG TUNG, Northwestern University, MILIND MALSHE, JULIUS JELLINEK, JEFF EASTMAN, HAWOONG HONG, DILLON FONG, FREELAND JOHN, Argonne National Laboratory — The layered Ruddlesden-Popper phases of $A_{n+1}B_nO_{3n+1}$, such as Sr_2TiO_4 and La_2NiO_4, have attracted much attention as potential materials for solid-oxide fuel cell cathodes and thermoelectrics. To understand the fundamentals of this class of layered oxide thin films, we studied the growth of (001)-oriented Sr_2TiO_4 and La_2NiO_4 on $SrTiO_3$ substrates by using oxide molecular beam epitaxy with in-situ surface x-ray diffraction. For Sr_2TiO_4, the synthesis of the double SrO layer followed by TiO_2 dynamically reconstructs back into the $SrTiO_3$ phase, which demonstrates that during thin film deposition other pathways under growth conditions can give rise to new structural arrangements. In contrast with Sr_2TiO_4, the growth of La_2NiO_4 involves the stacking of polar LaO^+ and NiO_2^- layers. This raises the question of how polarity mismatch at the interface with the $SrTiO_3$ substrate will influence the growth process. A detail comparison of these two cases will be discussed. Work at the Advanced Photon Source, Argonne is supported by the U.S. Department of Energy, Office of Science, and Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357.

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