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In situ x-ray study of oxide superlattice growth in reactive molecular-beam epitaxy JUNE HYUK LEE, X-ray Science Division, Argonne National Lab, SEO HYOUNG CHANG, Materials Science Division, Argonne National Lab, I-CHENG TUNG, Department of Materials Science and Engineering, Northwestern University, JEFF EASTMAN, DILLON FONG, Materials Science Division, Argonne National Lab, JOHN FREELAND, HAWOONG HONG, X-ray Science Division, Argonne National Lab — Improper ferroelectrity found in ultrashort period PbTiO3/SrTiO3 superlattices has attracted interests as one of new 'interfacially engineered' materials.[1] At the interface of PbTiO3/SrTiO3 superlattices, the coupling between the ferroelectric mode and antiferrodistortive rotations of oxygen octahedra creates improper ferroelectricity with a large dielectric constant. PbTiO3/SrTiO3 superlattices were grown using reactive molecular-beam epitaxy in a chamber with in situ x-ray diffraction capability at the Advanced Photon Source. The use of in situ surface x-ray diffraction allows one to study the evolution of oxide heterostructures. Here we present initial studies of PbTiO3 and SrTiO3 single layers as well as superlattices. [1] E. Bousquet, M. Dawber, N. Stucki, C. Lichtensteiger, P. Hermet, S. Gariglio, J.-M. Triscone, and P. Ghosez, Nature 452, 732 (2008).

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