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Evolution of $\sqrt{31} \times \sqrt{31}R9^\circ$ surface of $Al_2O_3(0001)$ generated in air HAWOONG HONG, Argonne National Lab, AARON GRAY, T.-C. CHIANG, University of Illinois, Urbana-Champaign — As reported by S. Baik et al[1] $\sqrt{31} \times \sqrt{31}R9^\circ$ surface of $Al_2O_3(0001)$ can be generated by annealing at a high temperature in air. We reproduced this $\sqrt{31}\times\sqrt{31}R9^\circ$ surface and investigated surface structures with x-ray diffraction using synchrotron radiation at Advanced Photon Source and RHEED techniques. We also annealed this $\sqrt{31}\times\sqrt{31}R9^\circ$ surface in a UHV chamber until the superstructure disappeared and a new $\sqrt{31}\times\sqrt{31}R9^\circ$ surface was generated. We will compare the results to the previous x-ray diffraction experiments[2] and recent AFM/DFT investigation.[3] The UHV generated $\sqrt{31}\times\sqrt{31}R9^\circ$ surface also appeared to preserve the $\sqrt{31} \times \sqrt{31}R9^\circ$ symmetries as Pd films were deposited. However, the intensity ratios between superlattice peaks went through large changes.

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