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Structures of Stoichiometric and Oxygen Deficient Sapphire Surfaces HAWOONG HONG, Argonne National Laboratory, AARON GRAY, T.-C. CHIANG, Department of Physics, University of Illinois at Urbana-Champaign, SHAWN HAYDN, MICHAEL GRAMLICH, YIYAO CHEN, PAUL MICELI, Department of Physics, University of Missouri — Sapphire, α-Al_2O_3 is one of widely used oxide substrates. Its (0001) surface is presumed quite stable. However, when it is heat-treated under vacuum, the surface shows the variety of different surface structures, mostly due to oxygen deficiency. The initial surface structure could be also modified by covering the substrate with another sapphire substrate during air annealing above 1500 $^\circ$ C. During the course of the heat-treatment under UHV condition, the x-ray reflectivity and crystal truncation rods were measured in addition to observing reflection high energy electron diffraction patterns. Metal films such as Pb, Ag, and Pd were deposited onto these various sapphire surfaces. Contrary to common belief that metal films would not grow well on insulating oxide substrates, metal films could be formed on some of the sapphire surfaces. The influence of the sapphire surface structure to the morphology of the metal films will be discussed.

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