O 75: Overview Talk: Ulrike Diebold

Time: Thursday 9:30–10:15 Location: S054

Invited Talk O 75.1 Thu 9:30 S054

Ternary oxides with the perovskite structure exhibit an intriguingly rich variety in their physical and chemical properties. — •Ulrike Diebold — Institute of Applied Physics, TU Wien, Wiedner Hauptstrasse 8-10/134, 1040 Vienna, Austria

The surfaces of these promising, yet complex materials are poorly understood. In the talk I will provide an overview of surface studies of perovskite oxides, and, for a few examples, discuss optimum preparation parameters for a reproducible surface structure and how this affects reactivity and growth.

The surface of $Sr_3Ru_2O_7$, the n=2 member of the Ruddlesden-Popper series, is structurally quite simple: cleaving in UHV yields a SrO-like top layer, which is essentially defect-free, except for impurities in the bulk material. The surface is very reactive towards components of the residual gas, however. CO, CO_2, and H_2O adsorb readily and form adsorption complexes. $SrTiO_3(110)$ is polar and exhibits a series of reconstructions that can be controlled by adjusting the chemical potential of its constituents, i.e. by evaporating appropriate amounts of Sr and Ti and annealing in O_2. The (n×1) reconstructions consist of a monolayer of titania with tetrathedrally-coordinated Ti atoms that are arranged in corner-sharing rings. When the Ti chemical potential is increased, the surface switches over to a (2×m) symmetry with a titania layer that is composed of Ti in octahedral coordination. These stoichiometry-dependent, facile structural changes have a profound effect on surface reactivity, and on the homoepitaxial growth of $SrTiO_3$ during pulsed laser deposition.