

# Cleaved SrTiO<sub>3</sub> (001) 1x1 surface studied by non-contact atomic force microscopy

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During the last decades there is an increasing interest in perovskite surfaces due to their remarkable properties such as high T<sub>c</sub> superconductivity [1], colossal magnetoresistance [2] or photo/electro/catalytic properties [3,4]. SrTiO<sub>3</sub> (STO) surfaces are particularly well studied due to the appearance of a two-dimensional electron gas [5]. In this study the cleaved, bulk-terminated (1x1) STO (001) surface was investigated by non-contact atomic force microscopy. The cleaving mechanism, which utilizes the strain-induced ferroelectricity [6], as well as its influence on the cleaved surfaces, is discussed. The as-cleaved surface is shown to consist of two distinct terminations: terraces with a metallic TiO<sub>2</sub> and a semiconducting SrO termination, both being up to micrometers in size. During the cleaving Sr atoms are pulled out of the top SrO layer and remain on the opposite TiO<sub>2</sub> surface in the form of adatoms; the concentration of these Sr adatoms is the same as the concentration of Sr vacancies on the SrO surface. The STO was cleaved at room temperature, and the effect of heating is discussed with an emphasis on the temperatures below 500K.

## References:

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