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The adsorption of hydrogen on the rutile $TiO_2(110)$ surface

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The adsorption of hydrogen on a well defined single crystal rutile $TiO_2(110)$ surface has been investigated using helium atom scattering (HAS). Whereas the adsorption probability of molecular hydrogen was below the detection limit ($S < 2 \times 10^{-7}$), the hydrogen adlayers were prepared by exposing the clean surface to atomic hydrogen. The results reveal the formation of a H(1 × 1) $TiO_2(110)$ surface. In addition, the adsorption and desorption kinetics were studied by monitoring the reflectivity of the surface for helium atoms. The analysis of the data yielded two desorption maxima with activation energies for desorption of 99 kJ mol^{-1} and 162 kJ mol^{-1}.