

1 Adsorption of atomic hydrogen on ZnO(10 $\bar{1}$ 0): STM study 1

Thomas Löber,^a Ulrich Köhler,^a Xiu-Li Yin,^b Alexander Birkner,^b Kathrin Hänel^b
5 and Christof Wöll^b 5

Received 31st October 2005, Accepted 23rd January 2006

First published as an Advance Article on the web

DOI: 10.1039/b515464b

10 The adsorption of atomic hydrogen on a single crystal ZnO(10 $\bar{1}$ 0) surface has been studied by
scanning tunneling microscopy (STM) under ultrahigh vacuum conditions at room temperature
and at elevated temperatures. High resolution STM images indicate that a well-ordered (1 × 1) H
adlayer is formed on the ZnO(10 $\bar{1}$ 0) surface. The STM data strongly indicate that the hydrogen
15 adsorbs on top of the oxygen atoms forming hydroxyl species. Scanning tunneling spectroscopy
(STS) studies reveal a H atom induced metallization at room temperature. In contrast to the clean
surface for the hydrogen-covered surface distinct defects structures consisting of missing O and
Zn atoms could be identified.

10

15