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Surface Reconstruction of TiO_2(001) Studied by STM and LEED

N.-H. YU, K.T. PARK, Department of Physics, Baylor University, Waco, TX 76798, USA, Z. LIAO, G. LI, X. HE, J. TENG, J. ZHANG, E.W. PLUMMER, Department of Physics and Astronomy, Louisiana State University, Baton Rouge, LA 70803, USA, DEPARTMENT OF PHYSICS, BAYLOR UNIVERSITY, WACO, TX 76798, USA TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY, LOUISIANA STATE UNIVERSITY, BATON ROUGE, LA 70803, USA TEAM — TiO_2(001) has been investigated by scanning tunneling microscopy (STM) and low energy electron diffraction (LEED). After cycles of Ar sputtering and surface annealing at moderate temperatures (up to 600 $^\circ$C for 15 minutes), TiO_2(001) reveals the so-called latticework reconstruction: row-like linear structures running along [110] and [1-10] directions. Each row further consists of bright spots separated by 6.5 Å, the lattice constant of the rutile along [110] and [1-10]. In some areas, the rows are separated by 6.5 Å and with the increasing step height of 3 Å, thus forming {111} microfacets. In other areas, the rows are distributed in a more random fashion. Together with LEED, the STM data suggest that the surface reconstruction can be described by added rows of stoichiometric TiO_2. Further details of the reconstruction model will be presented.

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