FORMATION OF NEW PHASES DURING THERMAL RE-ARRANGEMENT ON THE Cu(110)-(2X1):O SURFACE.

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Abstract

It is well known that oxygen adsorption on a Cu(110) surface is characterized by mass-transport of surface copper atoms from step edges and formation of a (2x1) oxygen strip phase [1-4].

Here we report on a discovery of new phases produced during thermal re-arrangement of the oxygen adsorbed Cu(110) surface. The oxygen-adsorbed surface was prepared by in-situ 3.7 L molecular oxygen adsorption at room temperature. The (2x1):O domains, randomly distributed on flat terraces having a characteristic zig-zag structure of etched step edges, were found to exist on the surface. Thermal annealing of the oxygen adsorbed surface resulted in: (i) structural re-arrangement of the step edges (ii) ordering of the (2x1):O strips into a superstructure and (ii) formation of new phases.

These minor phases, coexisting with the dominating (2x1):O superstructure, were found on specific surface locations only and were always confined by terrace steps. The symmetry, morphology and electronic structure of these new phases were characterized by STM. The origin of the new phases is discussed in terms of a step-confined copper atoms re-arrangement in vicinity of the surface steps.

References

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