

## New insights into the structure of the Ag(111)- $p(4\times 4)$ -O phase: high-resolution STM and DFT study

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**This supplemental material presents experimental details and the procedure of tip switching from the normal to the oxygen-sensitive state**

Figure 1S(a) shows the STM image demonstrating the tip switching from the oxygen-sensitive state to the normal state. During the switching, the tip apex changed, and the visual shift of the holes rows appeared in the image. The STM image in Fig.1S(b) proves that no changes in the real structure occur in the moment of the tip switching. Thus, we can confirm the existence of the two tip states. In the oxygen-sensitive state, STM contains bright trefoils (c), while in the normal tip state (d) only wide protrusions (associated mainly with silver atoms) are seen.

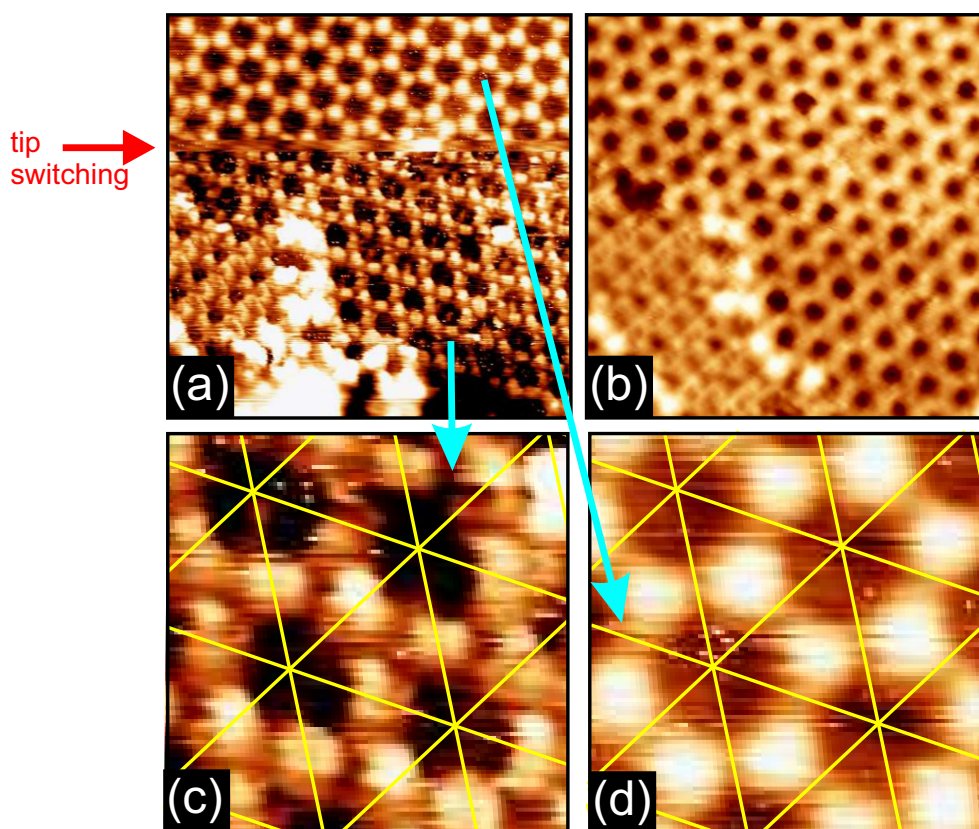


Fig. 1S (a) STM image ( $124\times 124 \text{ \AA}^2$ ) of the Ag(111)- $p(4\times 4)$ -O phase in which the switch of the tip state occurred. (b) STM image of the same place of the surface as in (a) recorded with a normal tip state acquired just after (a). (c) The fragment of (a) showing trefoils (oxygen-sensitive tip). (d) The fragment of (a) showing 'usual' image with big protrusions (normal tip). The direction of the slow scanning is from bottom to top.

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