

STM investigation on the initial dry oxidation of Si(100) at room temperature

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The oxidation on Si(100) is of great importance for applications to electronic devices. In this presentation, we report our recent findings on the initial oxidation of Si(100) by using Scanning Tunneling Microscopy at room temperature. We found a single novel feature which was generated by the adsorption of O₂. The density of the feature increases linearly with the oxygen dosage, which evidenced that it was created by the O₂ molecules. This feature occupies two successive dimer sites in the same dimer row and appears asymmetric along both the dimer - bond and the dimer - row directions. In both filled and empty states, the O₂ -derived feature is significantly brighter than the normal Si dimers. Differently from the previous experimental studies, we found out that there is no site preference of oxidation for defect sites (C, 1DV and 1 + 2DV). The observed characteristics may provide clues for the plausible structure models.