

Two features associated with the oxidation were observed by STM and were identified as a suboxide (incorporated oxygen) and ionic MgO. The clean step terrace surfaces were highly mobile and interact with the STM tip at room temperature. The ionic oxide formed first, on a double step pinning site and appeared as a protrusion elongated along the step edge. These sites appeared to be point defects which pinned the two terraces forming a double step. A form of suboxide characterized by broad bumps of 1.2 Å in height was present on the plain of the terraces. The bumps and protrusions grew in area and height with increased oxygen exposure. At 12L (Langmuir =  $1 \times 10^6$  torr.sec) exposure, the bumps coalesced to completely cover the surface. At higher oxygen exposures, most of the bumps observed were precursors for the formation of protrusions which leads to the thickening of the ionic oxide.

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