

Yttrium and oxygen adsorption on silicon Si(100)2x1 surface

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Abstract:

Oxygen adsorption on yttrium covered silicon Si(100)2x1 has been studied by Auger electron spectroscopy (AES), low energy electron diffraction (LEED), thermal desorption spectroscopy (TDS), electron energy loss spectroscopy (EELS) and work function measurements. The results show that oxygen penetrates underneath the yttrium overlayer and interacts with silicon substrate, by forming silicon oxide even at room temperature. In addition, a part of the adsorbed oxygen seems to interact with yttrium as well, forming yttrium oxide. Annealing of the oxidized surface results in the decomposition of both oxides, followed by yttrium partial desorption as yttrium silicide. A significant part of yttrium remains or/and diffuses into the silicon substrate, probably in the form of yttrium silicide compound.