In the last decade silicide growth and silicide/silicon interfaces have become of interest in solid state science because epitaxial metal silicides are a promising material for novel micro-electronic devices like the metal-base and the permeable base transistors.

In the present investigation monocrystalline (001) oriented films of CoSi2 have been formed on Si1-xGex/ Silicon(001) heterostructures with Ge-contents up to 25 at.% by molecular beam epitaxy (1). The atomic structure of the CoSi2/Si-xGex interface and the tetrahedral coordination of the silicon atoms is everywhere maintained. This model is well known from CoSi2/Si(001) interfaces.


MS12.01.06 ORDERED STRUCTURES AT THE METAL ELECTRODE/SOLUTION INTERFACE. C. A. Lucas, N. M. Markovic and P. N. Ross. Materials Sciences Division, Lawrence Berkeley National Laboratory, University of California, Berkeley, CA 94720

Unraveling the atomic structure at the metal-electrode/solution interface presents a great challenge to the experimentalist due to its inherently complex nature. X-ray diffraction is an ideal tool for study the surface of the bulklike Si(111) surface with little disorder. The displacement of the 2x1 domain from the fit under the assumption of a (1x1) structure when annealed above 200°C. This temperature is characteristic for the formation of the Ag-modified (7x7) structure at the interface. This structure transforms to a bulk-like (1x1) structure when annealed above 200°C. This temperature is characteristic for the formation of the (orbed on Si(111), This (3x3) R 30°-Ag reconstruction is also not retained at the interface even when it is buried under a room temperature deposited Ag film. Crystal truncation rod analysis of the Ag-modified (7x7) and (1x1) structures revealed the preservation of the Si stacking fault in the former and a Ag-Si mixed layer at the interface in the latter. These results may provide some insight into the observed Shottky barrier height difference for these two interfaces.

MS12.01.07 SCALING OF SUBMONOLAYER Cu ISLANDS GROWN ON Cu(110). D. A. Wallo, K. L. Whiteaker, and I. K. Robinson, University of Illinois, Urbana, IL 61801

The structure and properties of a thin film are often determined by the growth conditions as the first monolayer is deposited. We have studied the influence of an anisotropic substrate on the nucleation, growth, and coalescence of homoepitaxial islands. Surface x-ray diffraction was used in situ to study submonolayer deposition of Cu on Cu(110). After deposition, we found diffuse scattering near the out-of-phase condition featuring an elliptical ring, which is due to the anisotropic island morphologies. The major and minor axes of the ellipse are proportional to the island densities (or inversely proportional to the island spacing) in the in-plane [010] and [1-10] directions respectively. The density of islands in each of these directions scales with deposition rate and with substrate temperature. However, the scaling results are not well-described by mean-field rate equation formulations which fail to account for the full complexity of the fcc(110) surface. Evidence for a transition from one to two-dimensional island growth is seen at T ~ 208 K.

PS12.01.08 3-D STRUCTURAL ANALYSIS OF Ag/Si(111) INTERFACES BY X-RAY DIFFRACTION. R. D. Aburano, Haoong Hong, J. M. Roessner, K.-S. Chung, H. Chen and T.-C. Chiang, University of Illinois, and P. Zschack, ORISE

The interface of the "prototypical nonreactive" Ag/Si(111) system exhibits different structures depending upon the interfacial preparation. Room temperature deposition of a Ag film on a clean Si(111)-(7x7) surface results in a Ag-modified (7x7) structure at the interface. This structure transforms to a bulk-like (1x1) structure when annealed above 200°C. This temperature is characteristic for the formation of the (orbed on Si(111), This (3x3) R 30°-Ag reconstruction is also not retained at the interface even when it is buried under a room temperature deposited Ag film. Crystal truncation rod analysis of the Ag-modified (7x7) and (1x1) structures revealed the preservation of the Si stacking fault in the former and a Ag-Si mixed layer at the interface in the latter. These results may provide some insight into the observed Shottky barrier height difference for these two interfaces.