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# Atomic Structures of Ag islands on Si(001)(2x1)

Y.W.Kim, N.G.Park, W.S.Cho, J.H.Park, S.S.Kim*, D.S.Choi**, C.N.Whang

Dept. of Physics, Yonsei University.
* Dept. of Physics, Mokwon Univesity.
** Dept. of Physics, Kangwon Nat'l University.

## 1. Introduction

Most metals interact strongly with Si and form silicide layer. However, there is no silicide formation at the Ag-Si inerface. The work concerning the Ag/Si(001) system was concentrated on the growth and structures at room temperature. The results published so far are strongly contradictory in several points. Most striking are the different results reported about the saturation coverage, the structure of the first layer and the structure of Ag islands at higher coverages.

In this study we determine the atomic structure of Ag islands on Si(001) at room temperature and higher substrate temperature by Coaxial Impact Collision Ion Scattering Spectroscopy (CAICISS).

## 2. Experimental

All experimens were perfomed in an ultrahigh vaccum chamber having a base pressure of $1x10^{-10}$ Torr. The chamber was equipped with a CAICISS system, a four-grid LEED optics, and facilities for sample heating and metal deposition. The Si(001) samples were cut from silicon wafers, chemically cleaned immediately before introduction to the chamber, and then outgassed by heating to 700℃ at a pressure of less than $1x10^{-9}$ After degassing, they were flashed briefly to 1150℃ at a pressure of less than $2x10^{-9}$ Torr, cooled showly to room temperature. All samples were characterized by LEED at RT. Ag was evaporated from a tungsten filament onto substrates at RT and 600℃.

## 3. Results and Conclusions

Atomic structure of Ag on Si(001)(2x1) were studied by CAICISS. At room temperature Ag islands does not have explicit atomic structure, but grows Ag(011)/Si(001). However after annealing the sample, Ag islands begin to reconstruct. At annealing temperature 600℃ Ag islands is reconsturcted to Ag(001)/Si(001) with Ag<100>//Si<100>. And evaporating Ag at a substrate temperature 600℃, the atomic structure of Ag islands is the same orientation and direction, Ag(001)/Si(001) with Ag<100>//Si<100>.

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