

## Atomic Structures and growth of Ag on Si(001)

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The atomic structure and growth mode of Ag on Si(001) surface has been studied by coaxial impact collision ion scattering spectroscopy(CAICISS) at various temperature. At room temperature, Ag grows in SK mode and the two dimensional (2D) Ag layer is consisted of Ag dimers, which show Ag(2x2) structure and are located in the hallow site between the four neighboring Si dimers. The Ag dimers are perpendicular to the Si dimer and its bond length is 2.89Å. The three dimensional (3D) islands have a structures of Ag(011)/Si(001) and its [110] or [100] direction is parallel with the [110] direction of Si(001). The interlayer spacing between 1st and 3rd layer,  $d_{13}$  is 2.80Å. After annealing this sample at 600°C the 2D Ag layer is disappeared and the 3D Ag islands are reconstructed to the structure of Ag(001)/Si(001). The [110] direction of Ag islands is parallel to the [100] direction and the interlayer spacing  $d_{13}$  in the 3D Ag island is 4.09Å. By the way, for the deposition at a substrate temperature of 600°C, Ag grows in SK mode. In this case, the Ag atoms in the 2D layer is located at the bridge site in the height of 0.7 and 1.5Å from the Si dimer. The 3D Ag islands have a structure of Ag(001)/Si(001) and the [100] direction of Ag islands is parallel to the [100] direction of Si(001)

▶ This work was supported in part by the Korea Science and Engineering Foundation(KOSEF) through the Atomic-scale Surface Science Research Center(ASSRC) at Yonsei University and in part by the Ministry of Education (Project No. BSRI-97-2426).