18-8

Charge Transfer in Ion Beam Mixed Pd-Ag Alloy System

K.H.Chae, S.M.Jung, G.S.Chang, Y.S.Jeon* and C.N.Whang

Department of Physics, Yonsei University, Seoul 120-749

**Department of Physics, Jeonju University, Jeonju 560-759*

Recently ion beam mixing has been attracting more attention in view of surface and interface modification of materials. Ion beam mixing has as an advantage that some metastable composition and structures can be produced, which do not exist in the equilibrium state. Especially thin films prepared by ion beam mixing of multilayered structures have been used to prepare alloys or compound with new structual(amorphouse, quasicrystalline) or physical properties(transition from metal to insulator, ets.). Understanding of these physical properties is often improved by insight of its electronic structure.

In this study, charge transfer due to ion beam mixing was investigated using the variation of electronic structures of ion beam mixed Pd-Ag systems measured by x-ray photoelectron spectroscopy(XPS) and x-ray absorption near-edge spectroscopy(XANES). These results were compared with the results of Pd-Ag system formed by thermal treatment.

Due to alloying effects, Ag valence band shift toward the Fermi level, while Pd valence band shift to deeper binding energy. The core-level binding energy shift of Pd $3d_{5/2}$ and Ag $3d_{5/2}$ were 0.408 eV and 1.017 eV, respectively. And Pd d-band was filled linearly with the increase of Ag composition.

The amount of inter-atomic charge transfer in ion beam mixed alloy was larger than that of thermally treated alloy, while intra-atomic charge transfer was smaller. This result caused by average lattice constant difference which was induced by alloy formation environment.