

Surface alloying of Co on Cu(001) surface

S.-K. Kim and J.-S. Kim

Department of Physics, Sook-Myung Women's University, Seoul 140-742, Republic of Korea

J. Hahn and J.M. Seo

School of Physics and Technology, Chunbuk National University, Jeonju, Republic of Korea

S.C. Hong and C.K. Lee

Department of Physics, University of Ulsan, Ulsan 680-749, Republic of Korea

Surface alloying in the growth of ultrathin Co film on Cu(001) surface was studied by employing Xe as a probing atom.

Work functions and Xe 5p spectra for clean Cu(001) surface and Co films deposited both at room temperature and at around 50K were taken as a function of Xe dosage. Pure Co film, represented by thick Co film deposited on Cu(001) surface at 50K, showed no change of work function as the dosage of Xe increases in sharp contrast to Cu surface which shows linear decrease of work function. Binding energy of Xe 5p spectra on Co film showed blue shift with increasing Xe dosage while that on clean Cu(001) surface is almost constant before completion of one monolayer. Those two distinctive characteristics were taken as finger prints of Co and Cu covered surfaces, respectively. Then, nominal 2ML Co film deposited on Cu(001) surface at room temperature was examined by the finger prints. We found that about 30% of the surface is covered by Cu atoms, and the Cu atoms on the surface should be in close proximity with Co atoms without forming large segregated Cu domain in view of the very slow variation of the work function as a function of Xe coverage.