

Evolution of Cobalt Nanoislands and Electronic Structure Deposited on Stepped Cu(755) Studied by Angle-Resolved Ultraviolet Photoelectron Spectroscopy at SORIS Beamline

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Abstract

Using Cu(755) stepped surface as a template, we prepared nanoislands of Co and investigated their electronic structure by angle-resolved ultraviolet photoelectron spectroscopy using synchrotron radiation. From 0.28 to 1.6-ML Co coverage one broad peak is observed at 0.7 eV below the Fermi level. On the other hand, from 0.02- to 0.14-ML coverages non-dispersing two peaks are clearly resolved at 0.3 and 1.1 eV, respectively. The existence of the other peaks and the natures of these peaks are discussed based on the angular, step-orientation, and polarization dependences. The detailed assignments of each peak are done by the comparison with the literature.

The spectral change dependent on the coverage was due to the shifts of these peaks. The peak shifts are explained by the enhanced exchange splitting at the low coverages due to both energetic and spatial localization which is consistent with the nanoisland model.

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