Another PES system at BL-7

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Photoelectron spectroscopy (PES) is a powerful technique to directly elucidate electronic structures. Utilizing a various energies of photon produced by synchrotron radiation (SR), more detailed information can be obtained, such as surface vs. bulk electronic states, resonantly enhanced element-orbital-specific partial density of states, and so on. In order to perform PES measurements more conveniently, another PES system with a hemispherical electron energy analyzer, SCIENTA SES2002 has been tandemly installed at linearly polarized soft x-ray beamline BL-7 of SR center, Ritsumeikan University. The PES measurements are performed at room temperature under ultrahigh vacuum of ~1×10^{-7} Pa. Photon energy can be varied from 10 to 200 eV.

Figure 1 shows typical Au spectra taken with $h\nu$ = 40, 80, and 160 eV. Au valence bands [Fig. 1(a, c)], clear Fermi cut-off [Fig. 1(b, d)] and Au 4*f* core-level spectrum [Fig. 1(f)] are successfully obtained.

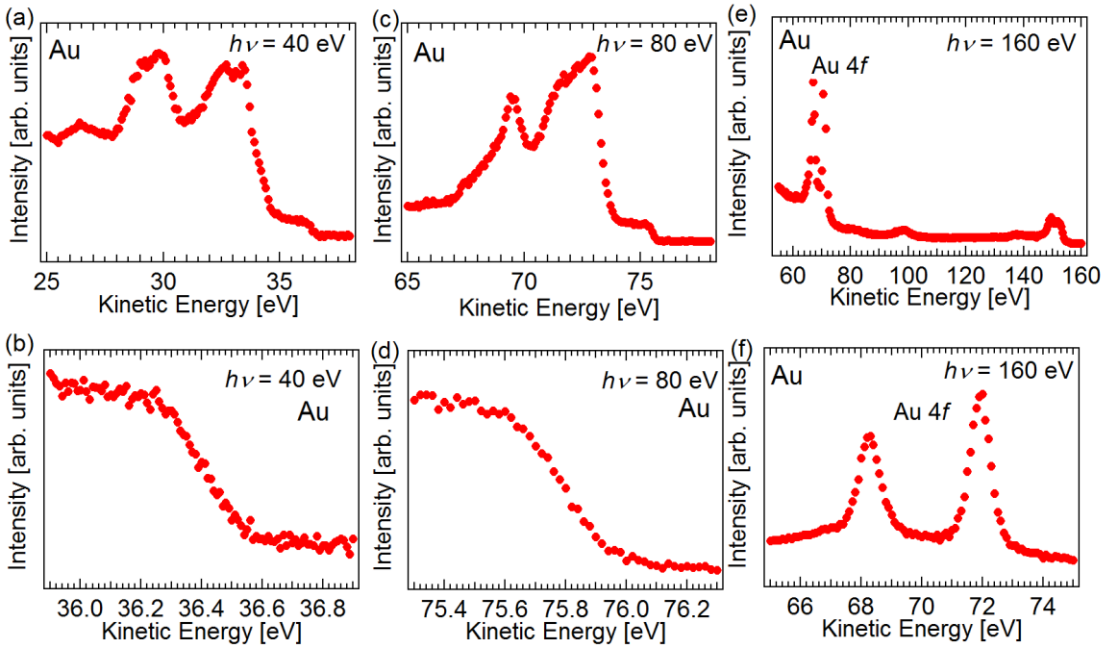

Fig. 1 PES results of Au. Au valence band and Fermi level spectra taken with $h\nu$ = 40 (a, b) and 80 (c, d) eV. Au wide region (e) and Au 4*f* (f) spectra taken with $h\nu$ = 160 eV.

Figure 2 shows the position-resolved PES result of an Au wire (ϕ0.2) on a Cu plate. Au and Cu valence bands are clearly observed depending on the position.

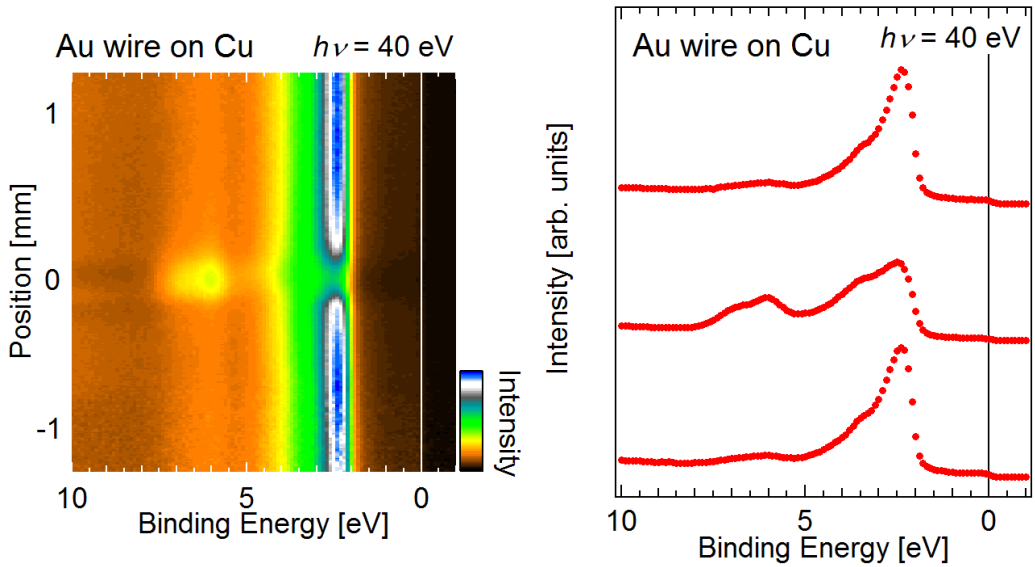

Fig. 2 Position-resolved PES result of an Au wire on a Cu plate. Intensity map and selected energy distribution curves for the Au wire position and the Cu plate positions.

Figure 3 shows the angle-resolved PES result of HOPG. The band dispersion reaching the Fermi level is clearly observed, which is consistent with the Fermi surface of graphite located at K point.

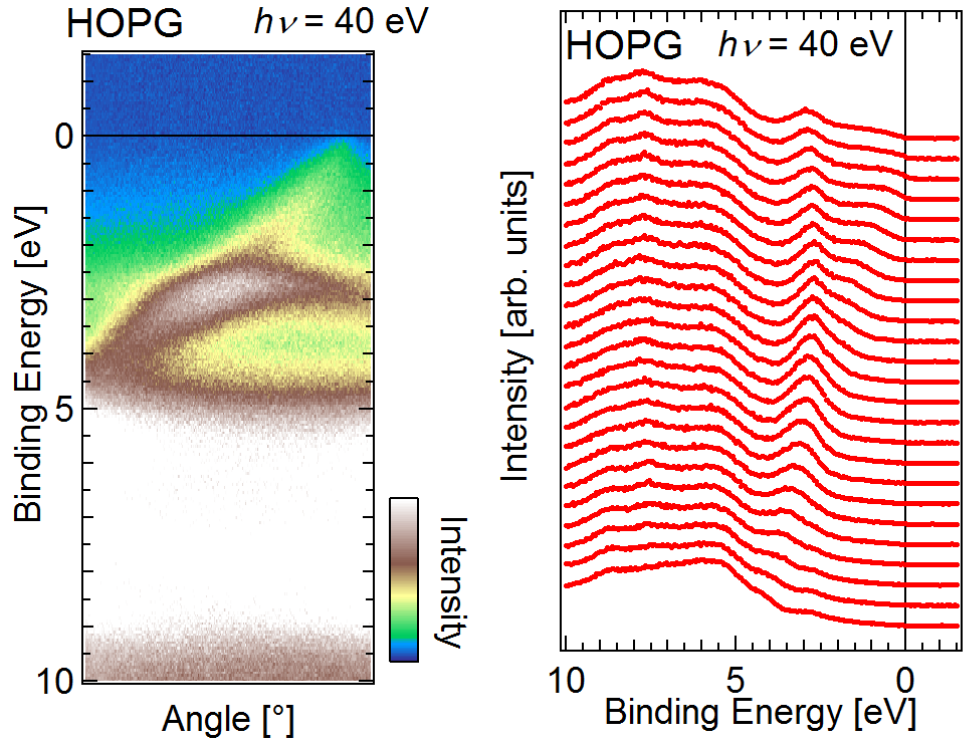

Fig. 3 Angle-resolved PES result of HOPG. Intensity map and the energy distribution curves of HOPG.

In summary, another PES system has been successfully installed at BL-7 and electronic structure analyses for various samples can be conveniently performed.