

Tuning of 2-dimensional photoelectron spectrometer and SPED

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For high resolution photoelectron holography (PEH) or 2-dimensional photoelectron intensity mapping, a display-type spherical mirror analyzer[1] is constructed for BL25SU of SPring-8. The advantage of this analyzer is that, the emitted photoelectron are converged to a focal point with keeping both kinetic energy and momentum by use of a spherical electric field. Hence we can do energy and momentum analyses at once.

The analyzer at BL25SU is newly designed. It has about 300 electrodes with a bigger size than the previous one in order to realize a better spherical electric field and higher energy resolution. Total energy resolution of about 0.5 eV (for $E_k = 500\text{eV}$) is predicted by calculation.

Manipulator and sample carrier are especially designed. The manipulator has 5 independent degrees of freedom (x, y, z, θ, ϕ) and 6 electric terminals. The sample carrier has a screw pole at the center of the carrier in order to be fixed hardly. So it has a good position reproducibility and good thermal conductivity. We can flow high current on 2 terminals, the limit value is 15A, so we can make a clean surface of semiconductor by direct heating. Other 4 electric terminals are used for several purposes as we like.

We also set up baking system. The main chamber's vacuum reached to $2.5 \times 10^{-8}\text{Pa}$. Furthermore, we measured quantum mass

spectra to check the quality of the vacuum. The upper spectrum is the mass spectrum of the cleaving chamber(Fig. 1a), and the lower one is the mass spectrum of the whole experimental and cleaving chambers(Fig. 1b). From Fig. 1a, the cleaving chamber seems to have no leakage. By comparison of Fig. 1a and 1b, there is no essential difference of the shape except for decrease of water and slight increase of fluorine in Fig. 1b. This difference will be due to the well-done baking. As a result, it suggests no leakage at the experimental chamber. Now the alignment of the chamber is under way.

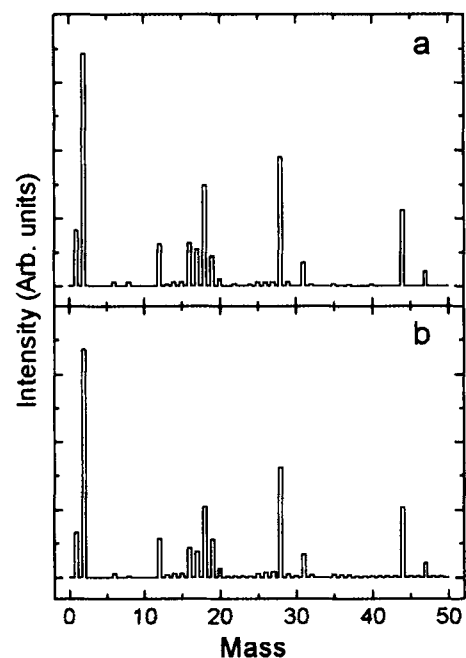


Fig. 1: Mass spectra of experimental chambers.

[1] H. Daimon, *Rev. Sci. Instrum.* 59 (1988) 545

H. Daimon *et. al.*, *Rev. Sci. Instrum.* 61 (1990) 57