Absolute Work Function Electron Microscope
- New Application of Emission Microscopy -

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The work function of surfaces is one of important physical quantities, quite sensitive to the surface condition and difficult to measure. In the present work, we are developing an absolute work function electron microscope using PEEM, which is a new field of the application of emission microscopy.

The principle of the absolute work function electron microscopy is quite simple: spatially resolved photoemission images using PEEM with the precise measurement of the appearance wave length (photon energy). FIG. 1 shows a schema of the developed absolute work function microscopy. The photon source is a Hg-Xe lamp (Hamamatsu Photonics), which emits photons with almost constant intensity down to about 230 nm. The radiation intensity of the Hg-Xe lamp between 230 and 350 nm is two orders of magnitude larger than that of a D_2 lamp. The light from the Hg-Xe lamp is focused on the entrance slit of a monochromator with newly developed a couple of aberration-free lenses. The Czerney-Turner mount double monochromator with zero-dispersion is used in the present microscope in order to reduce the stray light. The stray light ratio is less than 1×10^{-9}. The grating with 1800 l/mm whose braze wave length is 250 nm is used. In order to avoid the elongation of the light image at the exit slit of the monochrometer, a non-spherical mirror is settled to minimize the astigmatizm. The light from the exit slit is focused on a sample surface using a couple of aberration-free lenses. For the conventional PEEM observation, the high brightness Hg lamp system which has already developed by our group [1] is also enable using switching mirror.

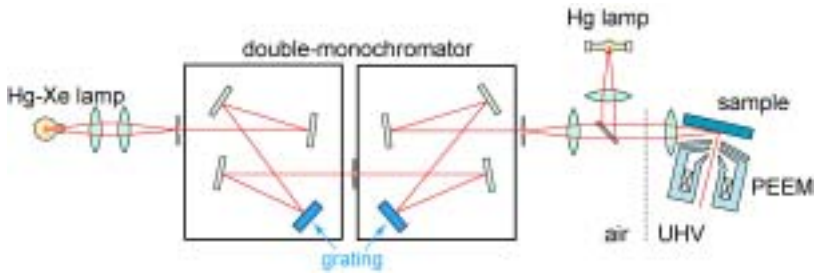

FIG.1 Schematic drawing of the developed absolute work function microscope. The high brightness Hg lamp system for conventional PEEM mode can be also used using switching mirror.

The details of the developed absolute work function microscope will be shown in the conference.

[1] Koshikawa T., Shimizu H., Amakawa R., Ikuta T., Yasue T. and Bauer E., *J. Phys.: Condensed Matter* 17 (2005) S1371.