Equipment Development Center

IX-AA Development of New Instrument

The technical staff of the Equipment Development Center is partly engaged in planning, researching, designing and constructing high technology experimental instruments in collaboration with the scientific staff. And these experimental instruments are incorporated with new manufacturing technology and new mechanical idea.

IX-AA-1 Development of a High-Precision Slit for Soft-X-Ray Emission Studies

MATSUSHITA, Koji[1]; YOSHIDA, Hisashi; SUZUI, Mitsukazu; HORIGOME, Toshio; HATSUI, Takaki; KOSUGI, Nobuhiro
([1]IMS and Nagoya Univ.)

An exit-slit system for the soft x-ray emission end station of the BL3U beamline has been developed. The slit comprises a set of two high-precision blades manufactured by using Electrolytic in-process dressing (ELID) grinding in collaboration with Nagoya University. The slit opening is adjustable from 5 to 100 micron by moving one of the blades in the direction perpendicular to the edge of the blades. The blade is connected to a piezo actuator *via* a solid metal flexure with a magnification of approximately 10. The blade (and the slit opening) is feedback controlled by a position stabilization system equipped with a capacitance-based sensor, which monitors the slit opening. The whole system has been constructed and is now under fine adjustment of the feedback control.

The slit system will be installed in August 2004, and be used in combination with the novel soft-x-ray emission spectrometer constructed by the department of vacuum UV photoscience.

IX-AA-2 Design and Fabrication of Undulator Beamline for STM Observations of Synchrotron Radiation Stimulated Reactions

MATSUSHITA, Koji[1]; SUZUI, Mitsukazu; NONOGAKI, Youichi; URISU, Tsuneo
([1]IMS and Nagoya Univ.)

The undulator beamline of BL7U at UVSOR was designed and fabricated for Chemical Dynamics Division in Department of Vacuum UV Photoscience. In the BL7U, the undulator radiation were focused by two Pt-coated cylindrical mirrors on the sample surface in the STM chamber set at end station of this beamline. The first mirror was located at 5100 mm downstream from the middle of the undulator. This mirror can move linearly by ±15 mm to adjust optical path. The second mirror was located at 2000 mm downstream from the first mirror. This mirror can move linearly by ±15 mm to the surface normal direction and rotates around both two axes of the vertical and horizontal directions by ±2°, to adjust the spot position on the sample surface.

The ideal design of the two rotating axes is that they are just on the mirror plane for easy beam positioning. However, horizontal rotating axis should be located far from mirror surface by the size of rotating mechanism, because rotating mechanism interfere the optical path. By using elastic hinges that have smaller size than ball bearings, we realized the small gap of ~4 mm between the mirror surface and the rotating axis in this system.

The beam positioning system and other beamline components have been constructed at UVSOR BL7U and used for synchrotron irradiation study.