

BL-27B Monochromatic X-ray beamline for radioactive samples

Experimental stations of BL-27 are located inside the "hot" laboratory where radioactive materials or samples including U or Th can be handled, in order to irradiate these samples with synchrotron X-rays or soft X-rays. The beamline is divided into two branch lines; one for soft X-rays (1.8 to 6 keV) and the other for X-rays (4 to 20 keV). In both branch lines, thin films are inserted inside the beam pipes in order to separate the hot experimental area from other cold experimental hall.

In BL-27B hutch, irradiation apparatus for radiobiology, XAFS spectrometer and 9-axis diffractometer are installed.

Light Source

Bending

Optics

Double crystal monochromator [Si(111)]
Sagittal focus available by changing the second crystal

Photons at sample

Energy range: 4 to 20 keV
Energy resolution: E/dE, about 10^4
Photon flux: maximum 10^{11} photon/s or 0.6 kR/s
Beam size: 40 mm(h) × 6 mm (v) (not-focused)

Facilities in Experimental Station

- a) Irradiation apparatus for biological samples
Sample scanning stage is available in order to irradiate samples wider than the beam size. Beam intensity is measured with a specially designed free-air ionization chamber.
- b) XAFS spectrometer
XAFS spectrometer similar to other XAFS station in the Photon Factory.
- c) 9-axis diffractometer
For detail, see JAERI-memo 09-112 (1997)

Devices in Preparation Laboratories

Biological sample preparation rooms are situated in this hot area. Various incubators for mammalian cells or microorganisms and other biological preparation or analysis equipment are available.

Other Information

The governmental law strictly limits usable amount of radioactivity. Advance consultation with beamline responsible persons is necessary.

References

- 1) H. Konishi et al., Nucl. Instrum. Methods A372, 322 (1996)
- 2) K. Kobayashi, Proc. International School of Physics, Course CXXVII, p333 (1996)

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