New Apparatus & Upgrades

Status of Engineering Research Science II Beamline BL14B2

By promoting the synchrotron radiation utilizations in the industrial field since fiscal 2000, the number of SR users increased in industrial applications using XAFS, powder diffraction, imaging, fluorescent X-ray analysis. We already have several public beamlines for XAFS (**BL1B1**), powder diffraction (**BL02B2**), and engineering research science (**BL19B2**) for industrial applications. However, the insufficiency of beam time particularly for XAFS and powder diffraction users is a serious problem. Thus, RIKEN and JASRI decided to fund and construct a new public beamline of XAFS for industrial applications at the bending magnet section **BL14B2**. We started the conceptual design of the beamline in fiscal 2005 and started construction in fiscal 2006.

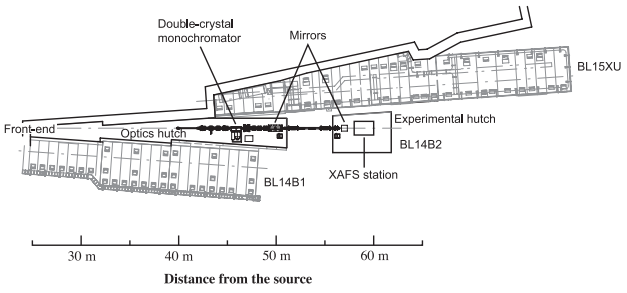

Fig. 1. Layout of beamline BL14B2.

Figure 1 shows the beamline layout including shielding hutches, optics and a transport channel, and the experimental station. The beamline component layout is similar to the layout of other SPring-8 standard bending magnet beamlines. The main optics components are the standard double-crystal monochromator and total-reflection mirrors for higher-harmonics rejection. The double-crystal monochromator and first mirror are installed in the optics hutch (Fig. 2). Silicon 111, 311 and 511 reflections cover the photon energy region from 5 to 100 keV. For higher-harmonics rejection, double-rhodium-coated mirrors can be set with glancing angles from 2 mrad up to 8 mrad depending on photon energy. They can also be taken from a direct beam path for higher energy utilization. An experimental hutch 6 m long × 4 m wide × 3.3 m high was constructed 4.7 m downstream of the optics hutch. The photon beam is guided through a lead-shielded beam duct between the hutches. The reflected beam from the first mirror is followed by the second mirror placed in the experimental hutch.

Fig. 2. Components of optics hutch. The SR beam comes from the left. The double-crystal monochromator (left), first mirror (right), and other beamline components (e.g. shutter and slit) between them can be seen.

In the experimental hutch, basic equipment for XAFS will be installed (Fig. 3). Transmission XAFS and fluorescence XAFS can be performed. Sample stages, attachments for sample environments, various detectors of germanium SSD, a silicon drift detector, and ionization chambers are installed on the table.

The beamline construction was completed in fiscal 2006. Commissioning started at the end of February 2007 and user operation will start in September 2007.

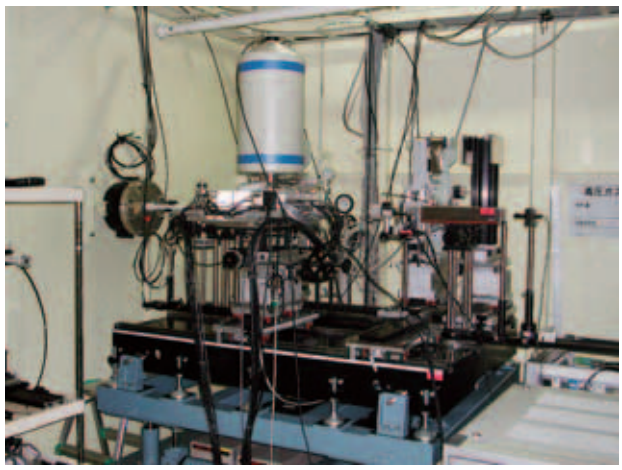

Fig. 3. Equipments of XAFS in experimental hutch (to be installed).

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