BL5S1: A new hard X-ray XAFS Beamline at the Aichi Synchrotron Radiation Center

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A new synchrotron radiation facility, "Aichi Synchrotron Radiation Center" (formerly called as Central Japan Synchrotron Radiation Facility) located at Aichi prefecture in the central region of Japan is open to the public since March 2013. At present, five beamlines for hard X-ray XAFS (BL5S1), X-ray powder diffraction (BL5S2), soft X-ray XAFS and XPS/PES (BL6N1), X-ray reflectivity and diffraction (BL8S1), and SAXS/WAXS (BL8S3) are in operation.

BL5S1 is designed for standard XAFS measurements using hard X-ray of 5 – 20 keV emitted from a super-conducting bending magnet (5T) installed into a storage ring operated at 1.2 GeV. The emitted X-ray reaches the experimental hatch through a Rh-coated collimating mirror, a Si(111) double-crystal X-ray monochromator, and a Rh-coated focusing mirror. The X-ray optics is presently operated in two different modes; a standard mode for the energy range of 7 – 20 keV and a lower energy mode for the energy range of 5 – 7 keV rejecting higher order reflections. The observed photon flux at the sample position is shown in Fig. 1.

BL5S1 has standard detectors such as ion chambers for the transmission mode, a 19-elements Ge detector (SSD) and a Lytle detector for the fluorescence yield mode. So-called quick XAFS mode is also developed and already dedicated to users. For example, a Cu K-edge XAFS spectrum of Cu foil can be recorded in 60 sec in good quality. Gas supply system for *in situ* experiments (O_2, H_2, and N_2), and sample changers are provided. It is also planned to provide a micro-XAFS system with a X-ray polycapillary glass (focused beam size is expected to be several tens of micrometer), a cryostat to cool samples, a conversion electron yield detector, and an *in situ* XAFS cell developed at the Photon Factory (<800 K). Beamline details and measurement examples of BL5S1 will be discussed at the presentation.

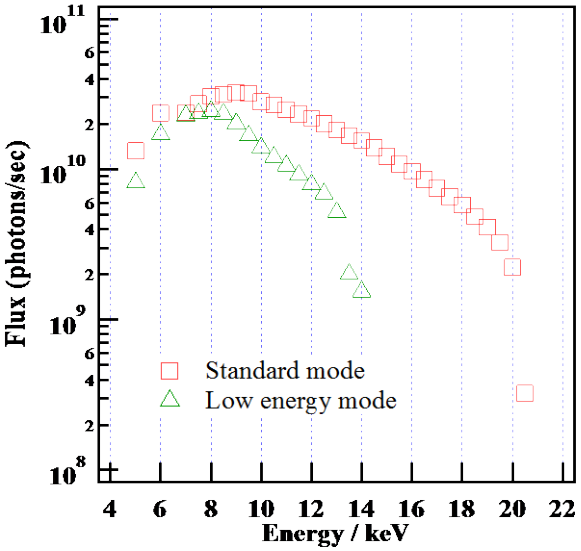

Fig. 1. Photon flux at BL5S1 (at sample position)