BL38B1
RIKEN Structural Biology I

1. Introduction

BL38B1 is a beamline reclassified as a new RIKEN beamline from FY2019 and is for small-angle X-ray scattering (SAXS) experiments using a bending magnet as a light source. In FY2019, the SAXS experimental system was restarted with the modification and evaluation of the BL38B1 X-ray optics and the SAXS devices formerly used in BL45XU. In FY2020, we promoted the improvement of the experimental environment from the optical system to measuring devices that can perform stable measurement and analysis, and the preparation and support for trial use to expand the experimental range from the biological sample to the material sample.

2. Recent activities

The X-ray optics employs asymmetric crystals for monochromators to increase the X-ray beam intensity. In addition, a cylindrical bent mirror with a length of 1 m is used to obtain a focused beam near the detector and reduce higher-order reflections from the monochromator crystal. The SAXS camera at the experimental station adopts the X-ray beam conditioning system that combines two sets of scatterless slits with a pinhole in front of the sample to reduce parasitic scattering in small-angle regions. The vacuum path and 2D detector PILATUS-3X 2M of the SAXS camera was moved from BL45XU and installed in BL38B1 with a standard setup of a fixed camera distance of 2.5 m.

We are collaborating with KEK/PF in the set up and operation of bio-SAXS experiments. In 2020, the HPLC system was updated to be fully compatible with KEK/PF (Fig. 1). In addition, most of the SEC-SAXS measurement and analysis environment has been standardized. As a result, bio-SAXS users can perform experiments in the same environment at both facilities and use data analysis software programs such as SAngler and MOLASS, which have been developed at KEK/PF and are compatible with BL38B1 measurement data. In 2020, we supported the correlation structure analysis of the BINDS (Foundation for Supporting Innovative Drug Discovery and Life Science Research by AMED) project.

Fig. 1. Upgraded SEC-SAXS system in BL38B1.

We also conducted a feasibility study of SAXS/WAXS measurement not only for bio-SAXS but also for material science SAXS such as polymer science. Starting in FY2021, BL38B1 will be released to RIKEN and public users in the fields of bio-SAXS and polymer science.

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