MS34 P01

CMCF 08ID-1 Beamline at the Canadian Light Source

Pawel Grochulski [a,b], Michel Fodje[a], and Louis Delbaere[b]. [a]Canadian Light Source, [b]University of Saskatchewan, Saskatoon, Canada.
E-mail: pawel.grochulski@lightsource.ca

Keywords: synchrotron radiation instrumentation, synchrotron radiation crystallography, structures of macromolecules

The Canadian Macromolecular Crystallography Facility has more than sixty participating protein crystallographers, located across Canada, will eventually consist of three beamlines; two insertion devices beamlines and one bending magnet beamline [1]. The first insertion device beamline (08ID-1) was intended to be a highly efficient and flexible, capable of satisfying the requirements of the most challenging and diverse crystallographic experiments, i.e. physically small crystals with large unit cell dimensions. The recently funded bending magnet 08B1 beamline has been designed to be dedicated to high-throughput data collection capable of being accessed remotely. The third, an undulator based 08ID-2 beamline, is envisioned to have micro-focusing capabilities with some restrictions in energy range. The CMCF 08ID-1 beamline has been built and is now being commissioned. The beamline is illuminated by a small-gap in-vacuum hybrid undulator (SGU), located in the upstream half of the straight section, and chicaned inboard by 0.75 mrad. The downstream half of this section is reserved for the 08ID-2 beamline SGU. The overall design of the beamline contains white beam slits (WBS), a double crystal monochromator (DCM) equipped with an indirectly cryo-cooled first crystal and a sagittally-focusing second crystal followed by a vertically focussing mirror (VFM). The beamline is completed with an innovative and very robust endstation, including the MarMosaic225 CCD X-ray detector. Most of the beamline components were manufactured by ACCEL Instruments GmbH (Germany). The beamline controls, similarly for the CLS facility, are being developed based on the EPICS platform. The beamline is equipped with a Röntek Spectrometer System (XFLASH 101A) for carrying out X-ray absorption near edge structure spectroscopy (XANES) for multi-wavelength anomalous diffraction (MAD) experiments, and X-ray fluorescence (XRF) for the detection of metal atoms in protein derivative crystals. The beamline will be equipped with a robotic cryogenic sample changer that is based on the SSRL design (SAM). At the meeting we will present recent results of experiments performed at the CMCF 08ID-1 beamline. The CLS is supported by NSERC, NRC, CIHR and the University of Saskatchewan..

[1] Grochulski P, Blomqvist I, Delbaere L, (2006) Status of the Canadian Macromolecular Crystallography Facility: Design and Commissioning of the 08ID-1 Beamline at the Canadian Light Source. *PiC* 62(5): 301-304.

MS34 P02

The new Materials Science synchrotron beamline HARWI II

Thomas Lippmann, Felix Beckmann, Rene V. Martins, Lars Lottermoser, Thomas Dose, Andreas Schreyer**Erreur ! Signet non défini.** *GKSS-Research Centre Geesthacht GmbH, Max-Planck-Strasse 1, 21502 Geesthacht, Germany.*
E-mail: thomas.lippmann@gkss.de

Keywords: synchrotron X-ray diffraction, materials structure and characterization, X-ray microtomography

In collaboration with DESY (Hamburg) and GFZ (Potsdam) GKSS has constructed a materials science synchrotron beamline at the storage ring DORIS on the DESY site in Hamburg, Germany. In this project DESY is responsible for the source, whereas GKSS provides and maintains the optics and the instrumentation for engineering materials science experiments. GFZ has installed a large press for high-pressure experiments on geological samples.

The HARWI II beamline can in many aspects be regarded as complementary to the planned high-energy materials science beamline at the new storage ring Petra III, because a large beam up to 70 mm width is available for global investigations of 'large' samples. Since both diffraction and imaging experiments are performed at the beamline, users can switch between two different monochromators, can move various absorbers into the beam in order to reduce the low-energy tail and can additionally select between various types of slits, shutters and beam monitors, which are located in an optics hutch. Moreover, a small fraction of the 'white beam' can be provided via a pinhole, if desired.

In the first experimental area a large materials science diffractometer was installed, which is characterized by a high flexibility (i.e. many degrees of freedom) and by the capability of carrying either small samples using a Eulerian cradle or
large samples and sample environments up to 600 kg. Available sample environments are ovens, cryostats, a stress rig for mechanical loads up to ±100 kN or a magnet. 2 medium-size detectors can be mounted and independently aligned on detector arms close to the sample. Additionally, 2 large area detectors can be mounted on 2 carriers of a detector portal and independently moved to any possible position up to 10 m behind the sample. Available detectors are Ge solid state and scintillation counters, a CCD, 2 gas-multi-wire area detectors, a MAR345 image plate scanner and a MAR555 flat panel detector.

Downstream, 2 experiment tables can be independently moved into the beam path. The first table is foreseen as 'user space'. At the moment, it is either used for an in-situ friction stir welding machine or a diffraction enhanced imaging experiment. The second table is equipped with a combined diffraction and tomography experiment (Dito). In future, it will be supplemented by a further tomography setup.

The press (MAX200x) is installed and maintained by the Geoforschungszentrum Potsdam. It is located in a separated experimental area. Either 'white beam' or monochromatic beam can be used here.

The present contribution will show figures and photographs of the actual status of the beamline and the experimental stations. Moreover, examples and results of first experiments concerning texture analysis, structure analysis, residual stress analysis and tomography will be presented.