remotely. Beamline I03 has recently been upgraded with a Pilatus 6M detector running at 25 Hz. This leads to an increase in throughput and allows for new methods like faster grid scans for locating hardly visible samples or to find the best area of a larger sample. We also provide data collection strategies and crystal and diffraction image characterization automatically. Very shortly after the data collection has finished the results from our automatic data processing pipeline are available and we have extended this now to the generation of difference electron density maps if a suitable PDB file is provided.

In order to adapt to the future scientific requirements of the structural biology community we are in the process of installing new experimental end-stations on the Phase 1 beamlines. The first of these has recently been installed on beamline I04 and details will be presented elsewhere.

In addition to the beam delivery by a bimorph KB mirror system providing typical beam sizes of 90 µm x 30 µm over the complete energy range, the new end-station is also equipped with two sets of compound refractive lenses (CRL) providing a beam size of 10 x 4 microns. This presents an additional challenge on the performance of the collimation system components, especially beam diagnostics for beam intensity and position measurements. Some new developments and preliminary results will be discussed. The new end-station also provides the possibility to add a mini kappa goniometer head and preparation work is ongoing for this.

Future capabilities will include category 3 pathogenic sample handling (I03) and an adaptable and improved software user interface. An update on these developments will also be presented.

[1] http://www.diamond.ac.uk [2] http://www.diamond.ac.uk/Home/Beamlines/MX.html

Keywords: diamond light source, macromolecular crystallography, beamlines

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Structural evolution of poly(ether-*b*-amide12) elastomers during uniaxial drawing studied using in-situ synchrotron WAXS and SAXS

Soo-Young Park,[a] Tahseen Kamal,[a] and Young-Wook Chang,[b] [a]*Department of Polymer Science and Engineering, Kyungpook National University, Daegu, Korea.* [b]*Dept of Chemical Engineering, Hanyang University, Ansan, (Korea).* E-mail: psy@knu.ac.kr

Poly(ether-b-amide)s have been commercially known as PEBAX. The general structural formula of these block copolymers is HO-[CO-PA-COO-PE-O]-H where PA and PE are polyamide and polyether blocks, respectively. Atochem© uses nylon 12 and poly(tetramethyle neoxide) (PTMO) for PA and PE blocks, respectively, for a PEBAX series with trade names of PXX33 where XX represents the amount of the PA measured by hardness of the block copolymer.[1-2] Structural evolution of PEBAX elastomers during uniaxial drawing was studied using in-situ WAXS and SAXS for elucidating hierarchical morphological development using a synchrotron radiation source with two distinctive block copolymers having different amounts of the soft and hard segments, P6333 and P2533 which represents a soft elastomer and a hard rubber, respectively. The in-situ SAXS and WAXS tracked morphological change of the lamellar, the crystal structure of nylon 12 block, and strain-induced crystallization of the polyether block. High flux of x-rays at a synchrotron made it possible to acquire structural information during sample stretching in real time which was beneficial over the methods used in the past by holding the samples at specific strain.

Several kinds of the nylon 12 crystal such as γ, α, α′, and α″ were observed at the different draw ratios during drawing PEBX film. P2533 has much longer polyether block than P6333. Long polyether block of P2533 could cause not only the strain-induced crystallization but also the fibrillation of the stretched chains. Short polyether block of P6333 prohibited the strain-induced crystallization and transferred the stretching force into the lamellae of the nylon 12 crystal so that the anisotropic crystal lattice deformation was observed only for P6333.

[1] G. Deleens, P. Foy, E. Marechal, *Eur Polym J* **1977**, *13,* 337. [2] G. Deleens, ANTEC **1981**, *419.*

Keywords: PEBAX, synchrotron, elastomer

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Facilities for Macromolecular Crystallography at BESSY II – HZB Berlin.

Manfred S. Weiss, Martin Bommer, Ronald Förster, Michael Hellmig, Michael Krug, Karthik Paithankar, Sandra Pühringer, Michael Steffien, Uwe Mueller, *Helmholtz-Zentrum Berlin für Materialien und Energie, Institute F-I2, Macromolecular Crystallography, Albert-Einstein-Str. 15, D-12489 Berlin, (Germany).* E-mail: msweiss@helmholtz-berlin.de

The Macromolecular Crystallography (MX) group at the Helmholtz-Zentrum Berlin (HZB) has been in operation since 2003. Since then, three state-of-the-art synchrotron beam lines (BL14.1-3) for MX have been built up on a 7T-wavelength shifter source [1,2]. Currently, the three beam lines represent the most productive MX-stations in Germany, with more than 500 PDB depositions. BLs14.1 and 14.2 are energy tunable in the range 5.5-15.5 keV, while BL14.3 is a fixed-energy side station (13.8 keV). All three beam lines are equipped with CCD-detectors. Beam lines BL14.1 and BL14.2 are in regular user operation providing about 200 beam days per year and about 600 user shifts to approximately 50 research groups across Europe. BL14.3 has been equipped with a HC1 crystal dehydration device and has been set back to user operation as a screening and test beam line in 2010. BL14.1 has recently been upgraded with an MD2-microdiffractometer including a kappa-geometry option and an automated sample changer. Additional user facilities include office space adjacent to the beam lines, a sample preparation laboratory, a biology laboratory (safety level 1) and high-end computing resources. On the poster, a summary on the experimental possibilities of the beam lines and the provided ancillary equipment for the user community will be given.

[1] U. Heinemann, K. Büssow, U. Mueller, P. Umbach, *Acc. Chem. Res.* **2003**, *36*, 157-163. [2] U. Mueller *et al.*, in preparation.

Keywords: synchrotron, beam line, macromolecular crystallography

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Colliding Beam Anomalous Measurements for S and P Phasing

James M. Holton,[a,b] Kenneth A. Frankel,[b] Alastair A. MacDowell,[b] John C. H. Spence,[c] [a]*Biochemistry and Biophysics, University of California, San Francisco (USA).* [b]*Lawrence Berkeley National Laboratory,1 Cyclotron Rd., Berkeley, CA (USA).* [c]*Department of Physics, Arizona State University, Tempe, Arizona 85287, (USA).* E-mail: JMHolton@lbl.gov