

The Rossendorf beamline BM20 at the ESRF: Overview and perspectives

Artem Shalimov^{1,2}, Carsten Baecht^{1,2}, Joerg Grenzer², Johannes V. Borany²

1. ROBL-CRG at the ESRF, B.P. 220, Grenoble F-38043, France

2. Institute of Ion Beam Physics and Materials Research, Helmholtz Zentrum Dresden Rossendorf (HZDR), Bautzner Landstrasse 400, Dresden 01328, Germany

e-mail: shalim@ifpan.edu.pl

The Rossendorf beamline (ROBL) BM20 at the European Synchrotron Radiation Facility in Grenoble is operated by Helmholtz Zentrum Dresden Rossendorf since 1999. ROBL belongs to Collaborative Research Group (CRG) of beamlines and provides two third parts of beamtime for users from HZDR, while the one third of beamtime is offered to external users selected by ESRF advisory committee. Two experimental stations are placed at the beamline: one is dedicated to materials research, while the second station is designed for spectroscopic investigations of actinides and other radionuclides. Material Research Hutch (MRH) is equipped with high precision heavy duty 6-circle diffractometer used for structural characterization of thin layers, nanoparticles, interfaces and analysis of other structural properties of solid state materials. Experimental installations allow users to perform different types of complex experiments including *in-situ* deposition, annealing in vacuum or gas environment, spectroscopic measurements, following (electro) chemical reactions or morphology transformations using available fast detectors and supplementary devices. Radiochemistry Hutch (RCH) possesses highly specialized safety system making possible investigations of alpha-emitting radionuclides by x-ray absorption spectroscopy (XAS) methods. (*More information at www.hzdr.de*).

Extensive upgrade of beamline optics, which assets in gain of beam brilliance, homogeneity and accessible energy range is scheduled in 2011. According to our calculation, new monochromator combined with toroidal x-ray mirrors will increase beam intensity up to 3 orders of magnitude in respect to the present value. Energy tunable in the range from 6 up to 35 keV allows users to realize element sensitive spectroscopic measurements like XANES and EXAFS, as well as x-ray scattering investigations (XRD, XRR, GID or GISAXS) in anomalous mode. MRH detector installations include novel 1D position sensitive and 2D image Dectris detectors, two modern energy dispersive detectors from KETEK and Bruker Axes, as well as traditional scintillator counters. Besides of that, experimental setup can be tailored with equipment loaned from ESRF instrument pool.

Summarizing the overview of Rossendorf beamline, we would admit broad spectrum of research feasible at ROBL stations: all possible diffraction measurements combined with spectroscopic analysis can be performed during *in-situ* experiments involving film deposition, different types of annealing, chemical reactions etc. Upcoming modernization of x-ray optics will significantly improve brilliance of the beam, giving outstanding possibilities for researchers in their most challenging experiments.

