



ROBL (GERMAN BEAMLINE) ON BM20: STRUCTURAL AND RADIOCHEMICAL INVESTIGATIONS

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The beamline is located at the bending magnet BM20.

The two experimental stations, operating alternatively, are designed for radiochemical investigations with x-ray absorption spectroscopy on the one hand and structural investigations of materials by x-ray diffraction and reflectivity on the other hand.

To fulfil its purpose, besides the optics hutch and a small beamline workshop, ROBL has two experimental stations: the radiochemistry hutch (RCH) and the materials research hutch (MRH). The RCH is built as a radiochemical laboratory of type B to perform experiments with radioactive samples having an activity up to 185 MBq (5 mCi). Such a dedicated installation is unique in the world at a synchrotron radiation source.

THE RADIOCHEMISTRY HUTCH (RCH)

The Institute of Radiochemistry is interested in research for risk assessment and remediation of radionuclide contaminations related to uranium ore mining and milling, of environmental contamination resulting from world-wide nuclear weapon production activities and nuclear

accidents. Furthermore, it is interested in research for risk assessment of potential nuclear waste repositories. A basic molecular-level understanding is required to quantitatively describe the mechanisms of radionuclide transport in the environment. XAS is a powerful technique to study speciation and complexation of radionuclides in solutions, adsorption processes at the solid-water interface of radionuclide solutions with geological and biological materials.

The radiochemistry hutch (RCH) is designed to handle radioactive samples (solid or liquid) with an activity of up to 185 MBq (5 mCi). The samples contain the actinides from Th to Am as well as Ra, Po and Tc.

The main experimental method will be x-ray absorption spectroscopy (XANES and EXAFS) in both the transmission- and the fluorescence mode (for diluted samples). A closed cycle He cryostat allows for studies in

the temperature range of 4-300 K. Quick EXAFS for time-dependent studies and microfocus x-ray absorption spectroscopy for spatially-resolved studies are planned. Different detection systems (ion chambers of different lengths, Ge solid state fluorescence detectors, fluorescent x-ray ion chamber detectors) will be available.

All radioactive samples will be delivered, stored and handled according to the safety regulations agreed upon with the ESRF. Only specially trained staff will be allowed to operate this experimental station. However, our expertise and help can be made available to collaborators.

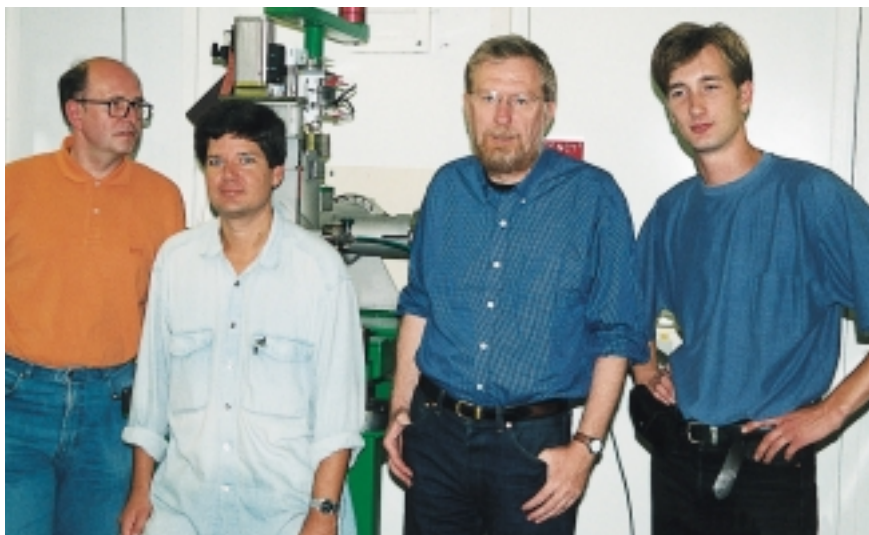
SOME HISTORY

In the beginning of the year 1995 the Forschungszentrum Rossendorf (FZR) near Dresden, Saxony, signed a contract with the ESRF to establish the German CRG ROBL in order to enhance the research capabilities of the biggest research institution of the new Länder in reunified Germany. Building and running of ROBL will be carried out by close co-operation of the Institute of Radiochemistry and the Institute of Ion Beam Physics and Materials Research as well as the Central Department of Research and Information Technology of the FZR. Since May 1996 a small permanent staff is residing at the ESRF to supervise and contribute to the building progress. The construction phase in the ESRF experimental hall started in May 1996.

Tests and preliminary experiments by FZR groups started early in 1998. The start of scheduled user operation of ROBL is planned for September 1998.

Staff situated in Rossendorf from left to right: S. Dienel, D. Pröhl, W. Oehme, R. Schlenk, W. Matz, P. Reichel, M. Betzl, M.A. Denecke, V. Brendler, G. Hüttig, F. Eichhorn, G. Bernhard, T. Reich, J. Claußner.





Local staff of ROBL at the ESRF with project leader W. Matz (left): N. Schell (Materials Research), H. Funke (Radiochemistry) and U. Strauch (technical service).

THE MATERIALS RESEARCH HUTCH (MRH)

The Institute of Ion Beam Physics and Materials Research will use ROBL within its scientific program for the identification and characterization of the modifications of surfaces, interfaces and near surface layers including phase formation produced by ion beam techniques. Research topics of the institute are hard coatings, nanoclusters, biocompatible materials and advanced semiconductors.

In collaboration with universities and other research institutes from the region structural investigations of melts, amorphous solids and phases in metal and semiconductor nanometer-multilayers as well as the analysis of the real structure of single crystallites or texture are planned. But also other users are invited to perform experiments in MRH in collaboration with the FZR. The basic equipment in MRH will consist of a high-precision 6-circle Huber goniometer, several detectors (scintillator, energy sensitive photodiode, two-dimensional PSD of

CCD-type) and a high-temperature chamber up to 2000 °C. ■

REFERENCES

- [1] More information is available under <http://www.fz-rossendorf.de>. Postal address: Forschungszentrum Rossendorf, P.O. Box 510119, D – 01314 Dresden.
- [2] ESRF Beamline Handbook; also at http://esrf.fr/exp_facilities/BLHB.htm.
- [3] Contact ESRF residents of ROBL at robl@esrf.fr.

ACKNOWLEDGEMENTS

We would like to thank the ESRF for their support in beamline planning and installation matters, and the ILL for agreeing to the temporary storage of future radioactive samples.

SPLINE (SPANISH BEAMLINE) ON BM25

At its July 1997 meeting, the ESRF Council has approved the construction of the Spanish CRG beamline (Spline) financed by the CICYT (Comisión Interministerial de Ciencias y Tecnología). The main goal of the Spanish CRG x-ray beamline is to satisfy the needs of the Spanish scientific community and give it access to a third generation synchrotron radiation facility to perform x-ray absorption and diffraction experiments in a broad energy range.

**The Spanish beamline will be split into two lines:
one branch will be allocated on the soft edge (A)
and the other on the hard edge (B) of the BM25 bending magnet.**

BRANCH A:

- High-resolution powder diffraction (HRPD) including anomalous dispersion.
- X-ray absorption spectroscopy (XAS) and x-ray standing waves (XSW).

BRANCH B:

- Macromolecular crystallography including MAD
- Single crystal diffraction and diffraction from interfaces
- X-ray diffraction/scattering camera for non-crystalline specimens. ■

The hutches are due to be constructed in January 1999. It is intended that the first station will be ready for user operation in January 2001. Full operation will start in the second half of 2002.

More in ESRF Beamline Handbook; also at http://esrf.fr/exp_facilities/BLHB.htm

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