ESRF	**Experiment title:** **XH: New germanium microstrip detector for energy dispersive EXAFS (EDE)**	**Experiment number**: MI-914
Beamline: ID24	**Date of experiment**: from: 19-09-07 to: 25-09-07	**Date of report**: 1 September 2008
Shifts: 18	**Local contact(s)**: Olivier Mathon	*Received at ESRF:*

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Report:

The 1024 element germanium microstrip detector (with a 50 μm pitch), XH,[1] was successfully installed and interfaced to the beamline ID24. The detector head was mounted in a cryostat on a copper head maintained at 100 K. Exposure tests showed that the detector was radiation hard under direct illumination at the Rh K edges (23 – 24 keV), unlike its silicon based predecessor (XSTRIP).

An example of a Rh foil spectrum is presented in Figure 1, with the ESRF operating in hybrid mode. A short integration time was required and a good signal/noise ratio derived

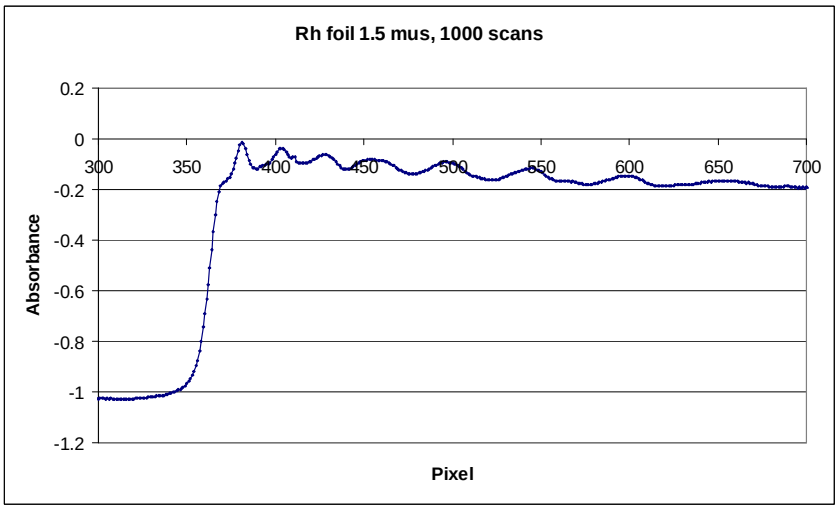

Figure 1. Rh K-edge energy dispersive XAFS specrtum of Rh foil, with 1000 scans of integration time 1.5 μs.

in a total acquisition time of 1.5 ms. There was some evidence of reduced energy resolution in the XANES region, which could be reduced by increasing the bias voltage on the detector.

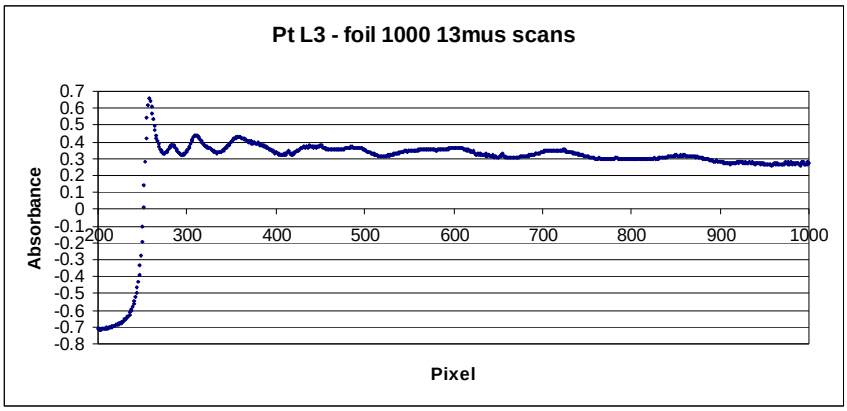

Figure 2. Pt L_{III}-edge energy dispersive XAFS specrtum of Pt foil, with 1000 scans of integration time 13 μs.

As shown in Figure 2, the detector system also performed well at the Pt L edge region near 11.5 keV. As an example of a more realistic sampling condition for a time resolved experiment, Figure 3 shows an accumulation of 25 μs acquisitions of a 100mM aqueous solution, the acquisition time being lengthened by use of an aluminium absorber. The spectra show a good statistical improvement with increased numbers of acquisitions, as will be required by time resolved experiments.

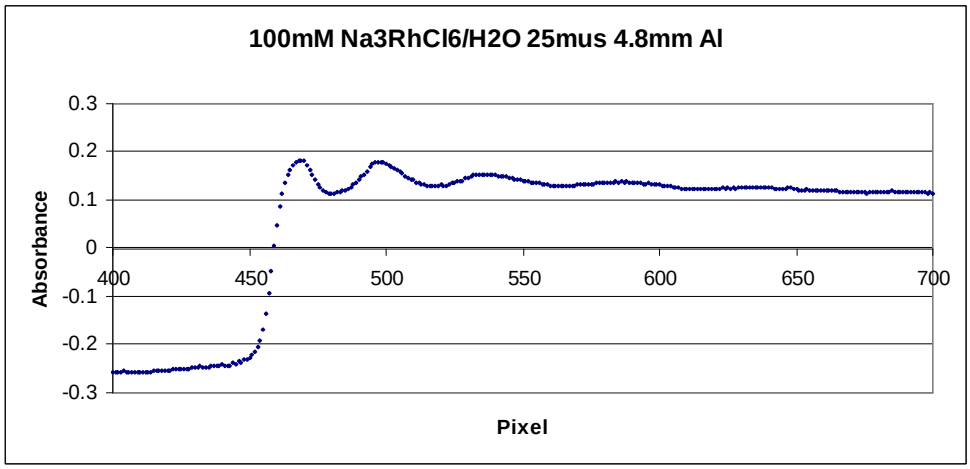

Figure 3. Rh K-edge energy dispersive XAFS specrtum of an aqueos solution of $Na_3[RhCl_6]$ (100 mM), with 1000 scans of integration time 25 μs. Incident beam attentuated by 4.8mm thickness of Al plate.

A fuller report of these trials has been presented at a conference,[2] and the XH detector was later used for time resolved XMXD studies involving ID24 scientists[3]

We are grateful for the assistance and support of the ESRF staff which was essential for this technically demanding series of tests.

Reference

1. G. Salvini, J. Headspth, S. L. Thomas, G. Derbyshire, A. Dent, T. Rayment, J. Evans, R. Farrow, S. Diaz-Moreno, C. Ponchut, *Nucl. Instrum. Meth. Phys. A*, 2005, **551**, 27.
2. J. Headspith, J. Groves, P.N. Luke, M. Kogimtzis, G. Salvini, S. L. Thomas, R.C. Farrow, J. Evans, T. Rayment, J.S. Lee, W.D. Goward, M. Amman, O. Mathon, S. Diaz-Moreno, *IEEE Nucl. Sci. Cof. Rec., 2007*, ***N55-2***, 2421.
3. http://www.esrf.eu/news/spotlight/spotlight52/XMCD-XAS/