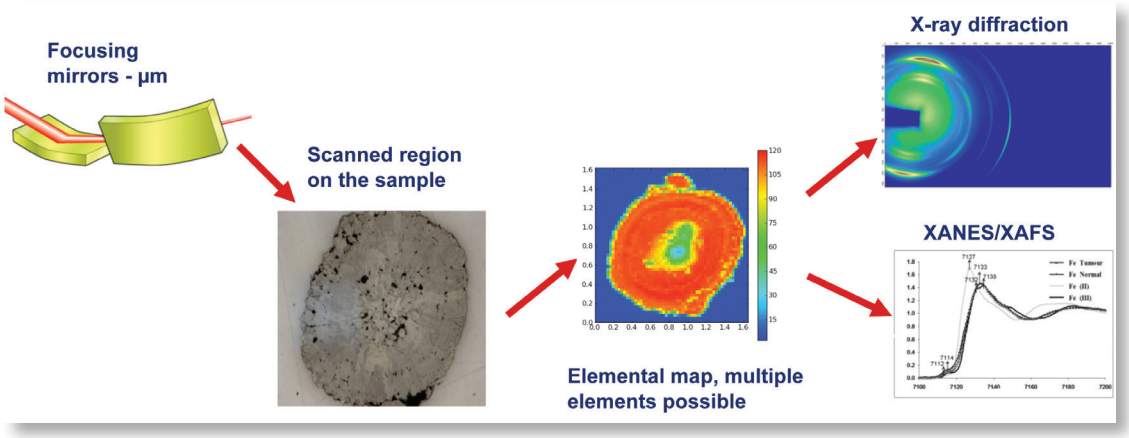
Imaging | X-ray Fluorescence | Spectroscopy | X-ray Absorption Spectroscopy (XAS) | Diffraction | X-ray Diffraction

diamond

I18 Technical Information

I18 - Microfocus X-ray Absorption Spectroscopy

I18 is a versatile, microfocus medium energy X-ray beamline dedicated for X-ray spectroscopy and structural investigations of complex systems. The XAS technique is complemented by microdiffraction and optical imaging methodology; therefore this beamline provides a world class facility, using high-brightness sub-micron X-ray beams for the study of complex inhomogeneous materials and systems in their operating conditions as well as investigations of materials in hostile environments. Dedicated optics for the µ-focus beam dimensions allows the mapping of elements in complex samples; subsequently the structure of the specific region of the studied material can be determined by µ-XRD or µ-XAS.



Beamline Specification

Energy range [keV]	2 – 20
Investigated elements	P – Mo (K edge) Tc – Am (L edges)
Beam Size (µm) at sample	4 x 4 (H x V)
Sample size	Maximum dimension 25 mm
Temperature range	20 – 1500 K
Techniques available	µ-XRD, µ-XAS, µ-XRF
Detector & Analyser	4 element Si drift fluorescence detector for the range 2-5 keV 9 element Ge detector optimised above 5 keV CCD detector for transmission diffraction experiments Electron yield vacuum cell with heating up to 800 K

For further information please contact the Diamond Industrial Liaison Office on

+44 (0)1235 778797

industry@diamond.ac.uk

www.diamond.ac.uk/industry

@DiamondILO

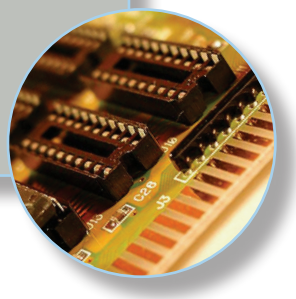
I18 Applications

Chemistry

- Direct studies of the structure and interactions of catalysts with the chemical reagents under various environmental conditions – three-way catalysts, fuel cells;
- Understanding of the corrosion process;
- Study of solution chemistry.

Material Science

- Study samples under realistic conditions of high pressures and temperatures;
- Study kinetic processes in operating electrochemical cells;
- Design and characterisation of novel, advances materials;
- Studies on the failure of various materials e.g. ceramic and composite materials.

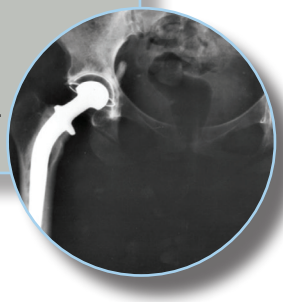


Environmental

- Study metal speciation of toxic materials to handle the remediation of environmental contamination;
- Study processes used for the disposal of toxic materials;
- Study rocks, soils, sediments, plant materials, pollutants and radioactive waste issues on climate change;
- Track routes of pollutants in the natural environment.

Bio-Medicine

- Determination of the structure of metalloproteins;
- Study biochemical processes – the life mechanisms of photosynthesis or respiration;
- Study the interaction between implant nanoparticles and the surrounding tissues;
- Examination of the form in which metal is accumulated in tissues e.g. studies of diseases such as Alzheimer's, Parkinson's.



For further information please contact the Diamond Industrial Liaison Office on

+44 (0)1235 778797

industry@diamond.ac.uk

www.diamond.ac.uk/industry

@DiamondILO