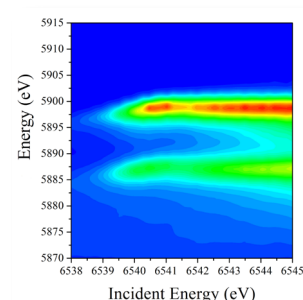
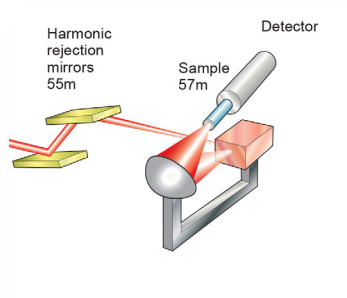
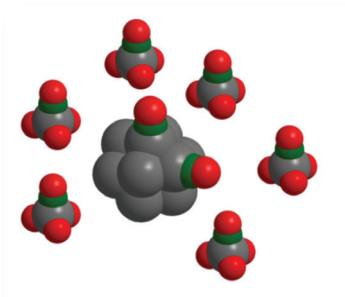


## I20 – Scanning and Dispersive X-ray Absorption Spectroscopy

I20 is a dedicated facility for static and time-resolved X-ray spectroscopy for studying the local structure and electronic properties of gases, liquids and solid state materials. This beamline consists of two branches: scanning & dispersive and aims to cover three very distinctive modes of operation:

1. X-ray Absorption Spectroscopy (XAS) on challenging samples,
2. X-ray Emission Spectroscopy (XES)
3. Energy Dispersive EXAFS (EDE)

The scanning branch offers monochromatic x-rays with high flux and high spectral purity in energy resolution and harmonic content for transmission and fluorescence measurements that will allow us to look into the ultradilute systems. The dispersive branch will be optimised for *in situ* time-resolved and extreme conditions X-ray spectroscopy studies. The whole EDE spectrum is collected simultaneously, which makes the technique especially useful for the study of fast processes. This opens up a great opportunity to study transient intermediates, give fundamental insights into a wide range of industrial processes such as reactions at solid/gas phase interfaces (high temperature fuel cells) and solid/liquid interfaces (hydrothermal synthesis of materials).



## Beamline Specification

Beamline I20	Scanning	Dispersive
Energy Range (keV)	5 – 20	6 – 26
Investigated elements	V – Nb (K edge), Cs – U (L edges)	Cr – Ag (K edge), Ba – U (L edges)
Beam Size ( $\mu\text{m}$ ) (at sample position)	400 x 300 (FWHM)	50 x 75 (FWHM) – energy dependant
Techniques	Transmission and Fluorescence XAS, XES – high energy resolution	EDE
Detector & Analyser	64-element monolithic Ge detector Si-drift detector XES spectrometer (MERLIN detector)	Ge microstrip-based X-ray detector Frelon detector

For further information please contact the Diamond Industrial Liaison Office on



+44 (0)1235 778797



industry@diamond.ac.uk



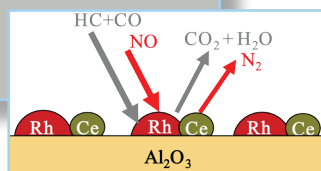
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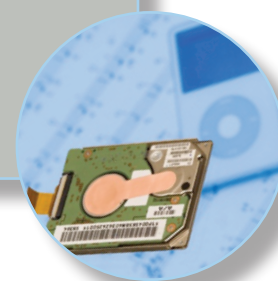
## Catalysts

- Direct studies of the structure and interactions of catalysts with chemical reagents under rapidly changing environmental conditions – three-way catalysts, fuel cells;
- The study of photochemical processes;
- The study of solution chemistry.



## Material Science

- The study of samples under realistic conditions of high pressures and temperatures;
- The study of kinetic processes in operating electrochemical cells;
- The design and characterisation of novel, advanced materials.



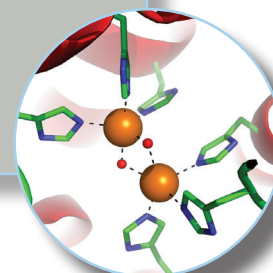
## Environmental

- The study of metal speciation of toxic materials to handle the remediation of environmental contamination;
- The study of processes used for the disposal of toxic materials;
- The study of rocks, soils, sediments, plant materials, pollutants and radioactive waste issues on climate change.



## Biology

- The determination of the structure of metalloproteins;
- The study of biochemical processes – the life mechanisms of photosynthesis or respiration



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