I20

Scanning X-ray Absorption Spectroscopy

I20 is a dedicated facility for static and time-resolved X-ray spectroscopy to study the local structure and electronic properties of gases, liquids and solid state materials.

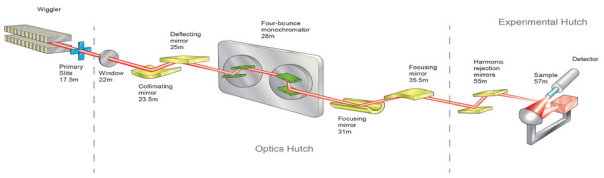
This beamline consists of two branches: scanning & dispersive and aims to cover three very distinctive modes of operation:

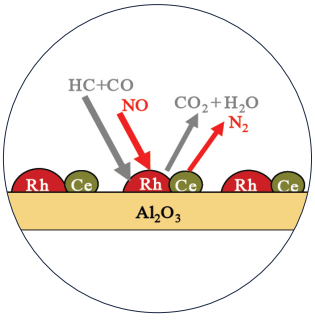
1.X-ray Absorption Spectroscopy (XAS) on challengingsamples,

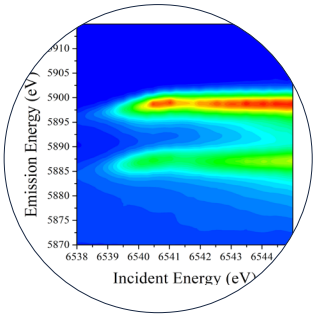
2.X-ray Emission Spectroscopy (XES)

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.





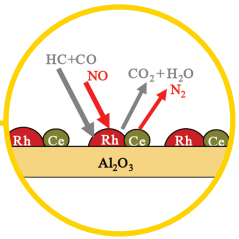


Beamline Specification

Energy range	5 – 20 keV
Investigated elements	K-edge: V – Nb L edges: Ce - U
Beam Size (µm) (at sample position)	400 x 400 (FWHM)
Techniques	Transmission and Fluorescence XAS Resonant and non-resonant XES High energy resolution XANES
Detector & Analyser	64-element monolithic Ge detector Si-drift detector XES spectrometer equipped with three analyzer crystals (Medipix detector)
Sample environments	Plug flow tube furnace (up to 1273 K) LN_2 cryostat Cryojets Automated gas delivery XAS: Closed-cycle He cryostat XES: LHe cryostat

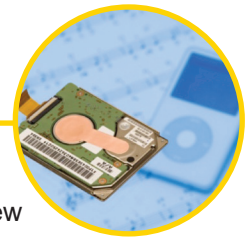
I20 APPLICATIONS

Catalysis



- *In situ* studies on the physical and chemical properties of selected metals in supported catalysts;
- Extracting structural information of metal nanoparticles in colloids at ultra-dilute concentration;
- Studies of solution chemistry;
- Investigations on metals in ionic liquids.

Material Science



- Optimisation of the doping content and microstructure in new spintronic materials;
- Studies on electronic and structural properties on doped luminescent materials;
- The design and characterisation of novel, advanced materials.

Environmental

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

Bio-Medicine

- Determination of the structure of metalloproteins;
- Investigations on the interactions between implant nanoparticles and the surrounding tissues;
- Studies of biochemical processes - the life mechanisms of photosynthesis or respiration.

For further information

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