

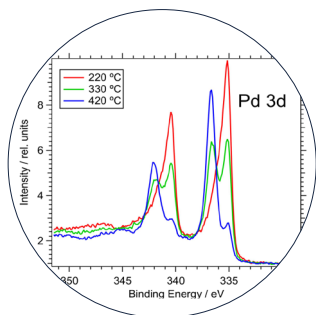
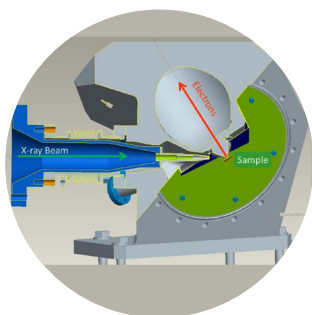
B07

# B07-C: X-ray Photoelectron Spectroscopy & X-ray Absorption Spectroscopy

B07 is a Versatile Soft X-ray (VERSOX) facility for soft X-ray Photoelectron Spectroscopy (XPS) and Near Extended X-ray Absorption Fine Structure (NEXAFS) measurements at near-ambient pressures.

B07-C is one of two branches on the beamline and is dedicated to Near Ambient Pressure XPS/XAS measurements. It operates at pressures up to 100 mbar depending on the gas used.

This capability enables studies of the surface composition of heterogeneous catalysts under working conditions as opposed to conventional *ex situ* characterisation, studies on biological and pharmaceutical samples under equilibrium water-vapour conditions, and direct spectroscopy of the surfaces of liquids which offers insight into the atmospheric chemistry of aerosols.



## Beamline Specification - B07C

<b>Energy range</b>	170 eV -2800 eV
<b>Investigated elements</b>	K-edge: B – S L-edge: P - Mo M-edge: Cl - Au
<b>Resolving power (E/DE)</b>	>5000
<b>Beam Size</b>	100 μm x 60 μm
<b>Photon Flux</b>	>10 <sup>10</sup> - 10 <sup>11</sup> ph/s
<b>Pressure range</b>	10 <sup>-9</sup> – 40 mbar
<b>Temperature range</b>	150-1100 K
<b>End station options</b>	Tea cup (Volume < 0.7L, pressure > 0.1 mbar, for catalysis, powder samples)  Tea pot (Volume ~5L, pressure > 10 <sup>-9</sup> mbar, for solid samples, single crystal)  Radial distribution chamber allows in-vacuum transfer from Load lock, Sample storage, UHV sample preparation chamber (LEED, ion gun, evaporators) into tea pot
<b>Detector &amp; Analyser</b>	NAP Electron Analyser (SPECS Phoibos 150) for XPS and NEXAFS up to 100 mbar H <sub>2</sub>  Total Electron Yield for NEXAFS

## B07 APPLICATIONS

### Catalysis & Electrochemistry



- Direct studies of the structure and interaction of catalysts with chemical reagents under various environmental conditions under changing pressure, temperature and water vapour;
- Characterisation of redox-active nanocrystalline oxides, microporous materials;
- Study chemical processes in operating electrochemical cells;
- Study on batteries during charging/discharging processes.

### Pharmaceuticals & biology



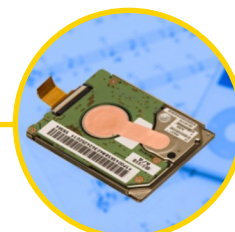
- Study biochemical processes and materials, e.g. characterisation of hybrid materials for artificial photosynthesis;
- Electronic and structural investigations on drug candidates;
- Investigate hydrogen bonding of organic materials to understand co-crystal and salt formation.

### Environmental



- Study metal speciation of toxic materials to handle the remediation of environmental contamination;
- Study the formation of minerals by bacteria.

### Electronics, Photonics & Polymers



- Design and characterisation of novel, advanced materials;
- Study materials, e.g. semiconductors, under more realistic conditions of pressures and temperatures.

## For further information

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