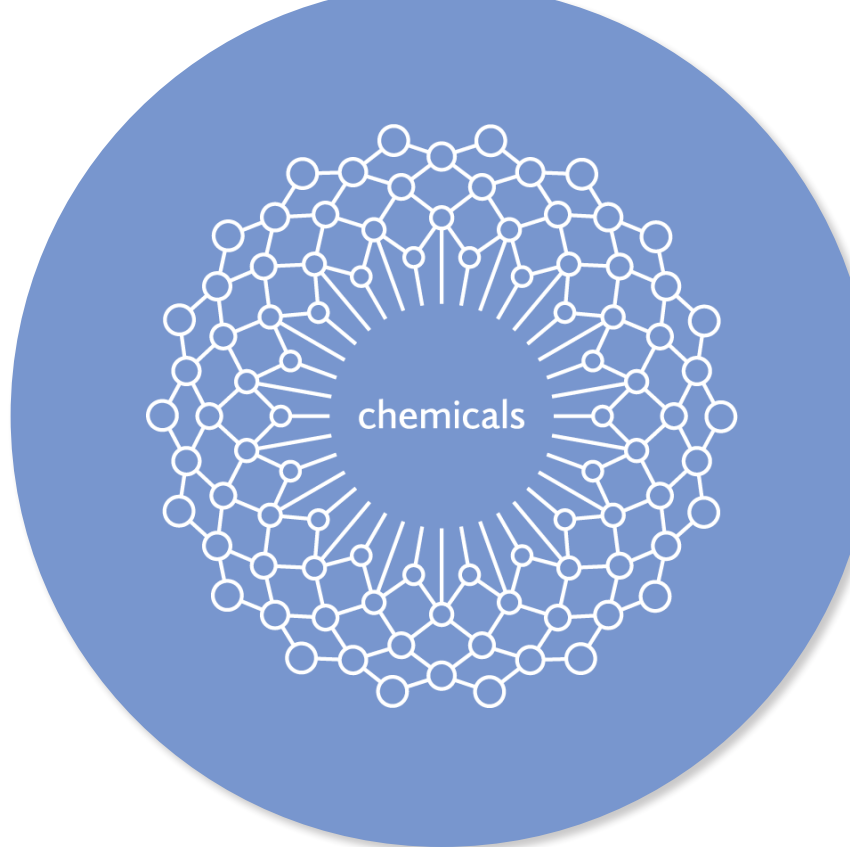


Chemicals research using Diamond



Unravelling the chemical and electronic properties of compounds is a real challenge due to chemical heterogeneity, sample nature and sensitivity to various conditions (gas flow and composition, temperature, pressure). Operando studies on chemical processes is crucial to design new reactions and manufacturing processes and it provides fundamental insights into the science of chemistry.

Located in South Oxfordshire, a region widely recognised for a strong technology business focus, the Diamond Light Source is a sophisticated synchrotron light facility which can generate highly intense beams of light ranging from IR and UV to X-rays, all of which are making research at the cutting edge of modern science possible. Diamond provides specialist analytical techniques and a wide range of sample environments to make complete characterisations of various materials at different physical states and understand its structure-function relationship.

In order to facilitate the use of Diamond by researchers working in industry, an Industrial Liaison team has been established, comprising highly qualified scientists experienced in a range of technique areas. This team can help to translate your research problem into an analytical solution by making use of its diverse expertise in synchrotron methods.

Depending on your specific requirements, we offer a range of service levels:

- **Beamtime only** – you come to Diamond and collect your own data
- **Remote access** – you send us your samples and collect the data yourself wherever you are
- **Data collection service** – we collect your data and send it to you for analysis
- **Full analysis service** – we collect and analyse your data and present you with a detailed report

Some examples of ways in which Diamond can provide research and development solutions for the chemicals industry are outlined overleaf.

For further information please contact the Diamond Industrial Liaison Office on



+44 1235 778797

industry@diamond.ac.uk

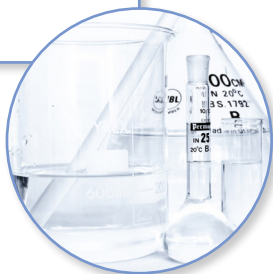
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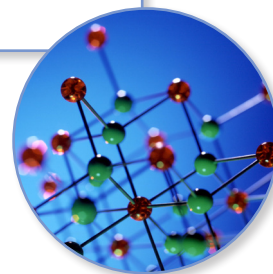
Organic Chemistry

- Understanding the mechanism of selective olefin oligomerisation catalysis using stopped-flow techniques;
- Studies on organic porous cages used for hydrogen storage and carbon capture and storage;
- Investigations on heavy metals complexes (phosphine ligands) used in chromophores that act as fluorescence quenchers in medical imaging.



Inorganic Chemistry

- Studies on multiple phases of transition metal oxides used in catalysis and electrochemistry;
- Investigations on lanthanide speciation in complexes used in separation & extraction of nuclear waste materials;
- X-ray chemical imaging of individual catalyst particles;
- Structural analysis of micro, meso and macroporous materials.



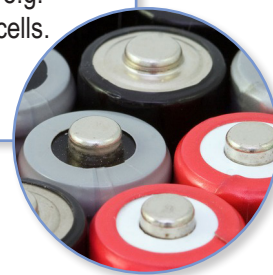
Physical Chemistry

- Probing the atomic structure of the electrochemical double layer at the electrode and alkaline electrolyte interface;
- Characterisation of new semiconductor materials applied in industrial production processes;
- Understand structure in a wide range of soft matter materials; e.g. polymers, colloids



Processing

- Investigations of the lithium ion-battery cycling mechanism during charging/discharging;
- Probing the formation of surface layers on anodes during operation;
- Direct studies of the structure and interactions of catalysts with reagents under various environmental conditions e.g. three-way catalysts, fuel cells.



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