ENERGY

Industrial research using Diamond

The eternal dream to explore matter at its deepest level has continually driven scientists to build more and more powerful instruments from simple microscopes to elaborate X-ray sources.

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 for the atomic to microscale characterisation of materials as diverse as novel pharmaceuticals, catalytic materials, coatings, motor oils, and large engineering components.

Our dedicated Industrial Liaison Team of highly skilled scientists is available to support you in every step of your research. The team can help to translate your R&D challenges into meaningful analytical solutions by making use of its diverse expertise in synchrotron methods.

Some examples of how Diamond can be used for energy research and development are outlined overleaf.

diamond.ac.uk/industry

Applications

Nuclear energy

- Structural and electronic characterisation of radioactive materials;
- Study of ion-exchange materials for nuclear waste remediation;
- Examination of features within bulk samples: cracks, pores, precipitates, phases of different composition;
- Element specific detection of contaminants even at very low concentration.

Fossil fuels

- Structural identification and characterisation of crystalline solids, powders and waxes;
- Studies of catalytic processes in petroleum refining including catalytic cracking, hydrocracking and isomerisation;
- Investigation into chemical synthesis for light olefin production and transformation of aromatics.

Gas storage

- Structural investigation of new porous materials used for hydrogen storage;
- Exploration of H_2, CO_2 absorption/desorption mechanism in the framework of porous materials.
- *In situ* chemical and physical studies of fast kinetic phenomena.

Batteries

- Exploration into surface structure and ordering in thin films and coatings;
- Examination of anode-cathode and electrode-electrolyte interfaces during oxidation and reduction;
- Tracking of structural and electronic changes of electrocatalysts under operating conditions.

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For further information

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