

# Automotive research using Diamond



To keep ahead of the competition, the automotive industry needs to identify and realise innovative developments in chemistry, materials science and engineering. A deep understanding of fundamental processes such as catalysis and detailed knowledge of material properties on the molecular scale is vital to developing and maintaining competitive advantage and minimising impact on the environment.

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 for the atomic to microscale characterisation of materials ranging from catalytic materials and novel advanced components through to coatings and motor oils.

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**
- **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 be used for providing research and development solutions to the automotive industry are outlined overleaf.

For further information please contact the Diamond Industrial Liaison Office on



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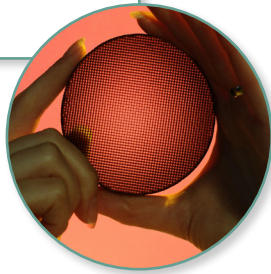
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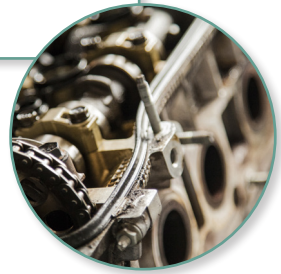
## Catalysts

- Element selective investigation of a wide range of materials; crystalline or amorphous and at very low concentration;
- Structural and electronic studies of homogeneous and heterogeneous catalysts in operating conditions;
- Follow chemical composition changes during corrosion;
- Study the surface structure of heterogeneous catalysts.



## Materials Structure

- Examine a wide range of advanced materials including metallic systems, ceramics, composites and performance polymers;
- Investigate materials manufacture and processing problems;
- Characterisation of materials with respect to the evolution of microstructure, crystallographic transformation and residual stress;
- Uncover cracks and voids, in static conditions or during *in situ* loading;



## Coatings

- Investigate surface and layer structure and ordering in paints and performance coatings;
- Characterise the nanostructure of non-crystalline materials under controlled environmental conditions: e.g. polymers, composites, alloys and ceramics;
- Investigate the performance of corrosion resistant coatings.



## Fuels & Lubricants

- Investigate fuel cells and hydrogen storage materials;
- Explore phase behaviour in fuels, motor oils and lubricants in the presence of additives;
- Understand interfacial phenomena relating to friction, lubrication and wear;
- Analyse particle shape, particle growth and self-assembly in colloidal systems.



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