

SCIENCE CITY RESEARCH ALLIANCE

UNIVERSITY OF
BIRMINGHAM

THE UNIVERSITY OF
WARWICK



FUTURE ENGINES AND FUELS RESEARCH

Fuel and Lubricant Development

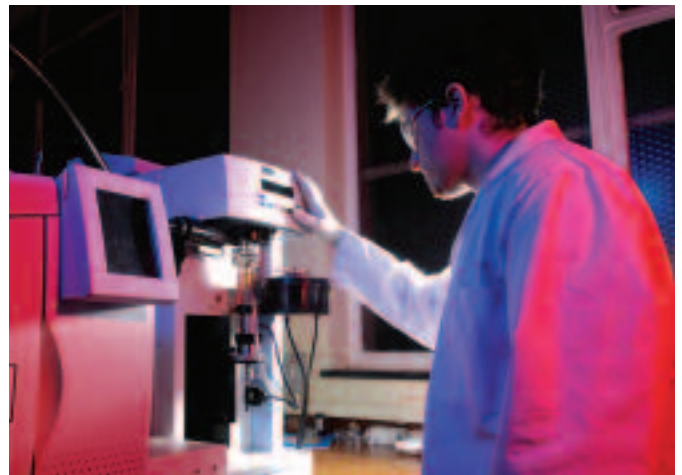
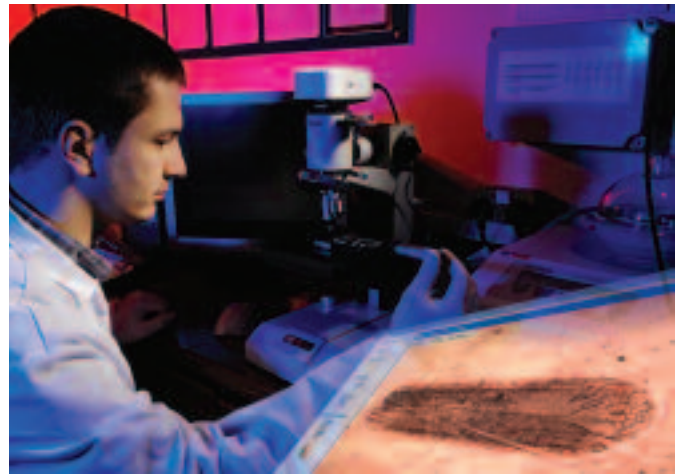
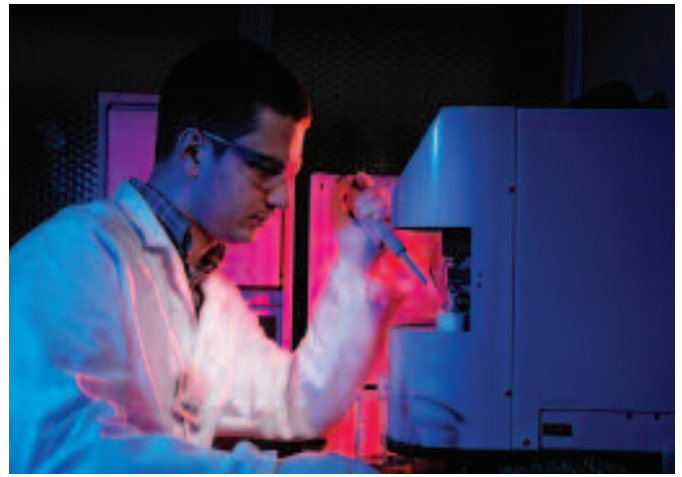
New state-of-the-art research facilities dedicated to fuel and lubricant development available at the University of Birmingham are capable of characterising and optimising new fuels. Such fuels include bio-derived fuels such as dimethylfuran, synthetic 2nd generation bio-derived Fischer-Tropsch fuels, alcohols and hydrogen (externally- and on-board-produced).

KEY FEATURES AND TECHNICAL SPECIFICATIONS:

- Perkin Elmer complete GC-MS-TGA System including the Pyris 1 Thermogravimetric Analyser with standard furnace and Thermal Analysis Gas Station, CLARUS 600 ARNEL Gas Chromatograph and Clarus 600 T Quadrupole Mass Spectrometer with Electron Ionisation and 1-1200 u mass range. The system is totally integrated and equipped with the latest state-of-art control and analysis software. It is possible to conduct speciation analysis of liquid and solid fuels, lubricants and exhaust gases. One of the most interesting applications is to compare the species signatures of fuels, lubricants and exhaust gases.
- PCS high-frequency reciprocating rig (HFRR) lubricity meter, including digital microscope, which can be used for the determination of lubricities of liquid fuels and lubricants to be used in internal combustion engines. Conforms to ASTM D6079, CEC F-06-A, ISO 12156, EN 590, JPI-5S-50 and IP 450 standards.
- Sita Proline T15 surface tension meter can determine the dynamic surface tension of liquid fuels to be used in internal combustion engines. The meter adjusts the bubble lifetime in a 15 - 15000ms range and is capable of measurements within 10 - 100mN/m.
- IKA C200 fuel calorimeter can determine higher calorific values of liquid fuels (including biofuels) to be used in internal combustion engines and also solid fuels.
- PCS ultra shear fuel and lubricant viscometer (USV) can determine viscosities of liquid fuels and lubricants to be used in internal combustion engines. The USV can carry out fully automated viscosity measurements over a shear rate range from 10^6 s⁻¹ to 10^7 s⁻¹ and temperatures between 40 and 150°C.
- Autoelektronika STPiW2 - high pressure fuel pump and injector test rig fitted with fuel conditioning unit can determine performance of various components of common rail fuel supply system. Additional fuel tank enables small volumes of alternative fuels to be tested.

KEY FEATURES AND TECHNICAL SPECIFICATIONS:

The Future Power Systems Group based at the University of Birmingham has developed world-leading expertise on diagnostics and improving the properties and combustion of fuels, including fuel reforming, application of hydrogen and multi-component biofuels in engines. We can offer a unique combination of studying the fuels and lubricants from their physical and chemical properties through their performance in strictly controlled and fully instrumented laboratory engines and also in modern production engines ending with the properties of their exhaust gases. Our major research partners have included Jaguar Land Rover, Johnson Matthey and Shell Global Solutions among others.



For further information and enquiries, including proposals for research collaboration and consultancy:

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These new research facilities are part of the Science City Energy Efficiency and Demand project funded by Advantage West Midlands and the European Regional Development Fund. The project is part of a wider investment in research infrastructure of the West Midlands region, which unites the Universities of Birmingham and Warwick in the newly-formed Science City Research Alliance.