

Centre for Advanced Energy Storage and Recovery

Heriot-Watt University has a reputation in business for innovation and quality, expertise, knowledge transfer and world-class research. The Centre for Advanced Energy Storage and Recovery (CAESAR) is an interdisciplinary centre for materials research and will complement the work of the Energy Academy and drive forward the Energy theme at Heriot-Watt. CAESAR exploits the unique synergy between engineering and scientific disciplines that exists within the School of Engineering and Physical Sciences and the Institute of Petroleum Engineering. By bridging traditional disciplines, the centre provides a seamless stream of expertise from theoretical modelling, through

to materials synthesis and characterisation, device fabrication and system-wide approaches, and implementation in real-world applications.

PRINCIPAL RESEARCH AREAS

- Thermoelectric Power Generation
- Supercapacitors
- Catalysts
- Carbon Capture
- Chemical Looping
- Hydrogen Storage Materials
- Diamond Films
- Polymeric Materials
- Superconducting Materials
- Gas Hydrates

INDUSTRIAL COLLABORATIONS AND CONSULTING

- Helia – Novel Polymers for Packaging and Optical-Based Security
- Fuel Cells Scotland Ltd. – Development of Redox-Stable Anodes for Next Generation Fuel Cells
- Defence Science and Technology Laboratory – Novel Thermoelectric Materials

RESEARCH FACILITIES

Research facilities are available for high-temperature materials synthesis in a range of atmospheres, arc-melter, inert-atmosphere glove box, powder and single crystal X-ray diffraction with a variable temperature capability, high-throughput X-ray diffraction, solid-state NMR, electrical property measurements, thermal transport property measurements, thermal analysis, scanning electron microscopy, electrochemical characterisation, reflectance spectrometer, dynamic mechanical thermal analysis, plasma deposition, surface characterisation, catalyst evaluation and testing, high-performance computing.

PEOPLE

Heriot-Watt is a forward thinking and research focused university, with world leading expertise in science and engineering. We are renowned for our applied and technological research and for our industry-oriented collaborations, which provide practical solutions to the energy challenges of today.



ACADEMICS	RESEARCH FOCUS AREAS
Professor Anthony Powell	Thermoelectric materials for power generation and refrigeration
Dr Paz Vaqueiro	Novel thermoelectric materials and microporous semiconductors
Professor Maciej Gutowski	Materials for hydrogen storage based on boron/nitrogen compounds
Dr Jan-Willem Bos	Thermoelectric energy conversion, high-temperature superconductors and water-splitting catalysts
Dr Nicole van der Laak	Materials development for clean energy generation and storage including supercapacitors and fuel-cell catalysts
Professor Philip John	Diamond-coated components for fusion reactors
Dr Arno Kraft	Microreactor technology
Dr Valeria Arrighi	Polyelectrolytes and Smart windows
Professor Mark Keane	Development of new-generation energy-efficient solid catalysts
Dr Graeme White	Carbon capture and storage
Dr Henry Bock	Computational modelling of nanoscale materials
Dr Robin Westacott	Computational modelling of gas hydrates and clathrates
Professor Marc Desmulliez	Microsystems
Professor John Wilson	Diamond-coated components for fusion reactors
Professor Bahman Tohidi	Gas hydrates
Professor Martin McCoustra	Surface characterisation of materials for energy applications
Professor Raffaella Ocone	Chemical looping for energy-efficient combustion
Dr Humphrey Yiu	Nanostructured materials for energy-efficient catalysis and green applications

RELEVANT POSTGRADUATE COURSES:

MSc Materials for Sustainable
and Renewable Energies

MSc Energy

MSc Renewable Energy Engineering

MSc Renewable Energy Development

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