CatalysisHub

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Background

THE Hub was founded in 2013 and has developed over 40 collaborating institutions, and has supported 82 novel and topical projects in catalytic science These projects have led to over 195 publications so far with 14 projects and 9 PHDs involving industrial CoIs. THE new themes will build upon this excellent success to date

The physical hub is in the Research Complex at Harwell, (RCaH) and includes first class facilities for research in catalytic science: used effectively by visiting scientists (academic and industrial) including those undertaking experimental work on the central facilities, while promoting fruitful interactions with other groups in the RCaH and the Harwell campus more broadly

A key component of the work of the Hub, has been its strong relationships with the world leading facilities on the Harwell campus; where work of the Hub team has led to the growing use and development of the facilities for catalytic science

Vision

•To establish a world-leading, comprehensive and coordinated programme of catalytic science in the UK.

•To develop new knowledge and promote innovation in and translation of catalytic science and technology.

•Enabling the UK to regain and retain a world leading position in catalysis.

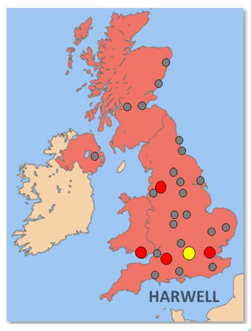
Key areas include

•Relationship with Facilities, Technique Development

•Early Career Development , and trainin the next generation of catalyst scientists

•Interactions with Industry, knowledge transfer and Impact

•Community Interaction and development



Optimising Predicting and Designing New Catalysts

A world leading programme of catalytic science and engineering, exploiting to the full the unique opportunities opened up be development in synchrotron, neutron and laser science

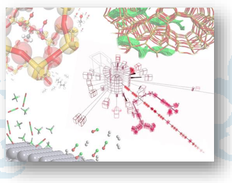
WP1: Engineered solutions for optimised operando synchrotron catalysis studies
Wells, Gibson

WP2: Novel applications of neutron scattering to catalysis
Lennon

WP3: Development of time-resolved Kerr-gate Raman spectroscopy for studying the evolution of molecular species in catalytic processes with lasers
Beale McGregor

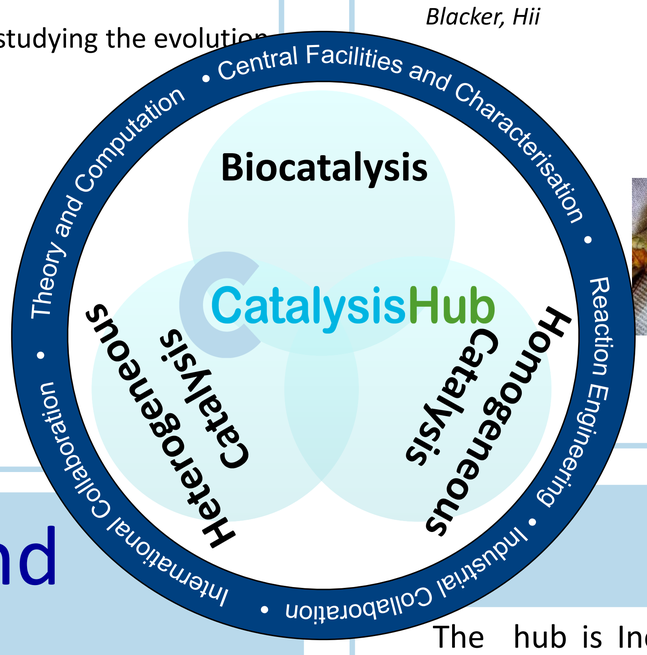
WP4: New areas and opportunities for Catalysis
Davis, Hutchings

WP5: Integrating catalysis through cascade processes
Weller, Dyer



WP6: Computational Modelling in Catalytic Science
Mulholland, Catlow

WP7: Changing the Philosophy of Catalyst Design: a Process Systems-Orientated Approach
Blacker, Gavriilidis, Hutchings



Catalysis for Circular Economy and sustainable manufacturing

Promoting the prosperity of the UK manufacturing through sustainability and circular value chains using catalysis

Traditional linear approach to production and consumption (take, make, dispose) unsustainable. New circular approaches (make, use, return) are growing in influence and importance with global economic growth and urbanisation

WP1: New cooperative catalysts for C-C bond forming reactions from CO_2
Aldridge, Wass

WP2: Activation of C-O bonds for utilization of bio-derived feedstocks
Blacker, Hii

WP3: Using and Understanding Catalytic Oxidation Processes in Flow
Hintermair, Muldoon

WP4: Earth-Abundant Metals in Resource Efficient Catalysis
Bedford, Webster

WP5: Keeping platform molecules in play
Garforth

WP6: New sustainable polymer architectures for high performance plastics
Buchard, Williams

WP7: Optimising Bio-based Platform Molecules
Farmer, Mulholland, Turner

Catalysis at the Water and Energy Nexus

Using catalysis to address current and future challenges to energy and water supply

Catalysis is a key underpinning technology to address the issues of clean water, more efficient utilisation/valorisation of water systems and the use of water as a reaction medium or reagent.

WP1: Treatment of High Ionic Strength Waste Water
Hardacre

WP2: Catalytic treatment to reduce biofouling of membranes
Plucinski

WP3: Energy-efficient catalytic advanced oxidation processes for water and wastewater treatment
Hutchings

WP4: Catalytic transformations in and with water
Marr

WP5: Energy and fuels from waste water
Wilson

WP6: Life cycle sustainability assessment
Azapagic

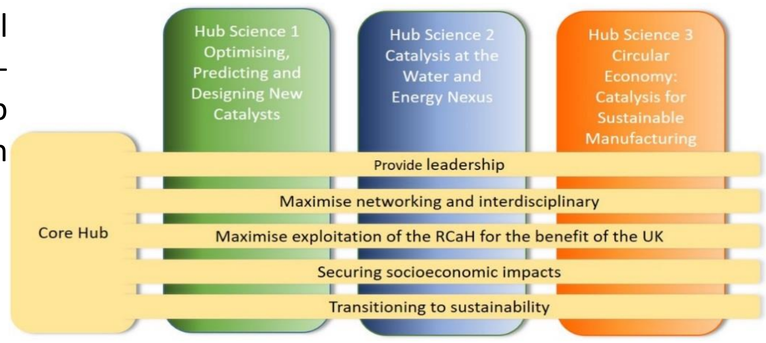
WP7: Modelling

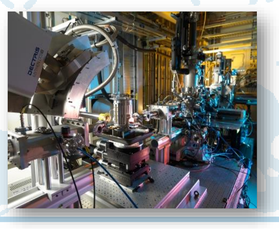
Core

The hub is Inclusive and open to all; Collaborative, multi-institution and multidisciplinary and the Projects aim to utilise collaborative teams to tackle major challenges in catalytic sciences

The **Core** theme will provide over all co-ordination of the hub activities and interaction including:

- Conferences, and Workshops,
- Website and social media,
- Community Development,





To ensure technique development for important challenges across the field of catalysis the Hub will have two strategic research projects at the Harwell Hub

WP1: High throughput and improved sample environments for catalysis at central facilities
Emma Gibson (Glasgow)

WP2: Data analysis, processing and curation
Barbara Montanari (STFC)

More Details

For more information on the projects, or how to interact with the Catalysis Hub please contact the Project Manager , **Dr Josie Goodall** by email josie.goodall@rc-harwell.ac.uk, www.ukcatalysishub.co.uk

Research Complex at Harwell

EPSRC
Engineering and Physical Sciences Research Council