UK Catalysis Hub Webinar Programme 2020

https://ukcatalysishub.co.uk/webinars/

27 AUGUST
15:00

Catalysis for the Production of H2O2 and its Applications in Bio-Enzymatic Cascades

Dr. Simon Freakley (Bath)

Hydrogen peroxide has a key role to play in developing clean chemical processes. The direct synthesis of hydrogen peroxide from H_2 and O_2 would represent an attractive atom efficient process which could be decentralised as an alternative to the large scale anthraquinone process. Pd based catalysts have been extensively studied for this reaction however selectivity remains a key challenge to prevent the over-hydrogenation or decomposition of the H_2O_2 to H_2O. This webinar will describe our work on developing Pd based catalysts for the synthesis of H_2O_2 which reach high levels of selectivity in both heterogeneous and electrochemical systems. In addition, the development of one pot reaction cascades which combine enzymatic peroxygenases and heterogeneous H_2O_2 synthesis catalysts to achieve challenging oxidation reactions at mild conditions will be discussed.

17 SEPTEMBER
14:00 - 16:00

The Applied Catalysis Group (ACG) & UK Catalysis Hub Meeting

Dr. Christopher Mitchell (Sabic), Dr. Robert Parry (SRP Catalysts), Dr. Andrew Marr (QUB) & Dr. Katherine Wheelhouse (GSK)

Dr. Christopher Mitchell (SABIC) 'Laboratory scale testing of formed catalyst particles'
For many heterogeneously catalysed processes, the final commercial application requires the use of formed catalyst particles in order to manage pressure drop, heat and mass transfer etc. It is therefore imperative that the performance of catalysts in their final form is evaluated relatively early in the development cycle. The presentation will cover different approaches to the testing of formed catalysts at the lab scale, in particular the concept of a "pellet string" reactor.

Dr. Robert Parry (SRP Catalysts) 'A look at Powder Hydrogenation Catalysts; Increasing the Catalyst performance'
Many of the catalysts handled and used industrially, will be formed to a shape like extrusions, tablets, spheres etc for use in continuously operated reactors. However powdered catalysts used in batch, slurry reactors are also widely used particular for Fine and Specialty chemicals. This presentation looks at a snapshot of catalyst manufacture, some tips on mixing and usage, reactor types and separation and catalyst reuse for subsequent batches. The necessity for improved activity and selectivity to the desired product, improved mixing, gas distribution and the relation to process scale up from lab and pilot plants, leads to many difficult questions. This short presentation attempts to elucidate the whole trouble-shooting field even down to purity of process gases, reactor types and feedstock purity and cost versus its catalyst poison profile. Examples of 3 applications for powdered catalysts are discussed.

Dr. Andrew Marr (QUB) 'Biocatalysis and Homogenous Catalysis: best kept apart, or stronger together?'
The rapid growth of biocatalysis research has provided many new technologies, and solved significant problems in chemicals synthesis. Examples can be found for which biocatalytic methods are a significant improvement over traditional routes. However, it is unlikely that biocatalysts will provide a cost-effective alternative to chemocatalysts in every case. This means that the ideal synthesis of a valuable target is likely to comprise a mixture of biocatalytic and chemocatalytic steps. It is therefore timely to examine the similarities and differences, the compatibilities and incompatibilities of the two approaches. In this lecture the growing relationship between biocatalysis and homogeneous catalysis will be highlighted, and we will consider the question: should biocatalysis and homogenous catalysts be kept apart, or are they stronger together?

Dr. Katherine Wheelhouse (GSK) 'Catalyst selection in pharmaceutical manufacture'
The types of reaction typically performed in pharma, how catalysts are selected from a performance and availability perspectives and the additional consideration of residual metals in the product.

UK Catalysis Hub Webinar Programme 2020 cont

1 OCTOBER 15:00

Heterogeneous Catalysis: The Future of Organic Synthesis?

Prof. Dr. Matthias Beller (LIKAT Rostock)

A seminar given by Prof. Matthias Beller. Matthias Beller studied chemistry at the University of Göttingen, where he completed his PhD thesis in 1989. As recipient of a Liebig scholarship he then spent a one-year with Sharpless at MIT. Afterwards he worked in industry until 1995, when he moved to the TU of Munich as Professor for Inorganic Chemistry. In 1998, he relocated to Rostock to head the Institute for Organic Catalysis, which became in 2006 the Leibniz-Institute for Catalysis. The work of his group has been published in >1000 original publications, reviews and >158 patent applications have been filed / H-index: 127. Matthias Beller was honoured with a number of awards including the Otto-Roelen Medal, the Leibniz-Price and the German Federal Cross of Merit. Besides, he received the first "European price for Sustainable Chemistry", the "Paul-Rylander Award" of the Organic Reaction Catalysis Society of the USA, the Gay-Lussac-Alexander-von-Humboldt-Prize of the French Academy of Sciences and the Emil Fischer Medal of the German Chemical Society. Moreover, he was awarded an honorary doctoral degree from the University of Antwerp and of the University of Rennes 1. He received the Wöhler price for Sustainable Chemistry from the German Chemical Society and an ERC Advanced grant from the European Commission. In 2017, Matthias Beller was awarded the Karl Ziegler Prize from the German Chemical Society and the Karl Ziegler Foundation, one of the highest honors in the field of chemistry in Germany. He has received as the first European chemist with the ACS Catalysis Award Lectureship. Last year, Beller was selected as the prestigious "Hassel Lecturer" from the University of Oslo and for the "Gordon Stone Lectureship" of the University of Bristol as well. Beller is Vice President of the Leibniz Society and member of the German National Academia of Science "Leopoldina" and three other Academies of Sciences.

27 OCTOBER 15:00

Microbial cell factories - engineering biology for chemicals production

Prof. Nigel Scrutton (Manchester)

Biocatalyst engineering and the engineering of microbial cell factories for chemicals production has promised to deliver new routes to chemicals production. Major hurdles to scaled production of chemicals using microbial cell factories remain. I will discuss a number of the current technical, scientific and economic challenges of chemicals production using microbial cell factories. The journey will move from automated strain engineering of the type that we have established in the Manchester Synthetic Biology Research Centre (SYNBIOCHEM) through to multiple scale-up challenges. De-risking of scale-up challenges is being met in the UK Future Biomanufacturing Research Hub (FutureBRH) together with industry partners. Selected examples will be discussed and in particular, I will summarise early commercial activities in the area of fuels production – work that has emerged from microbial strain engineering and scale-up in SYNBIOCHEM and FutureBRH.

19 NOVEMBER 15:00

Chemocatalysis vs Biocatalysis: When do industry use which, and how can we bring them together?

Dr. Amanda Jarvis (Edinburgh) & Dr. Samantha Staniland (Johnson Matthey)

Dr. Amanda Jarvis - A brief introduction to artificial metalloenzymes

This talk will briefly introduce artificial metalloenzymes (ArMs) – biohybrid catalysts that aim to bring together the benefits of transition metal catalysts and enzymes. Using examples from our work, I will illustrate how we can design and prepare ArMs, and their use to date in catalysis.

Dr. Samantha Staniland - Why biocatalysis?

This talk will explore the pros and cons of biocatalysis vs. chemocatalysis from an industrial standpoint.

UK Catalysis Hub Webinar Programme 2020 cont

23 NOVEMBER 15:00

An Introduction to Patents: What, when and how?

Dr Tom Turner & Dr. Katy Pellow (Abel + Imray)

Abel + Imray will be hosting an “Introduction to Patents” webinar aimed at explaining what a patent is, why patents are relevant to you, as a chemist, and how you go about patenting an invention.

Obtaining adequate protection for your ideas from an early stage is crucial in order for you to get maximum benefit from your invention. The webinar will provide an overview of patents and how to obtain patent protection in the UK, Europe and worldwide, with a particular emphasis on how to spot when you have a patentable invention, and when to starting thinking about filing a patent application.

14 DECEMBER 15:00

The fundamentals of Catalysis at the Molecular level

Prof. Richard Catlow (UCL/Cardiff)

A seminar highlighting the use of computer modelling in conjunction with synchrotron and neutron techniques.

JANUARY 2021 (Date TBD)

Title TBD

Dr. Arunabhiram Chutia (Lincoln)

8 FEBRUARY 2021 15:00

Sono-Electrocatalysis: The Use of Sound for the Development of Water Electrolyser and Fuel Cell Electrocatalysts and Electrodes

Prof. Bruno G. Pollet

This presentation highlights some of the research works undertaken over the years by the Pollet´s groups in Birmingham, Cape Town and Trondheim in the application of power ultrasound for the fabrication of electrolyser and fuel cell catalysts, electrodes and hydrogen production.

FEBRUARY 2021 (Date TBD)

Title TBD

Assoc. Prof. Ai-Lan Lee (Heriot-Watt) & Assoc. Prof. Fernanda Duarte (Oxford)

Assoc. Prof. Ai-Lan Lee - Catalysis: Gold, Silver, Light

This webinar will highlight a couple of projects from the Lee Group: i) silver effects in homogenous gold catalysis, ii) dual gold- and photoredox-catalysis.

Prof. Fernanda Duarte - Computational Modelling for Supramolecular and Catalyst Design

For more information and to register visit - https://ukcatalysishub.co.uk/webinars/