



Advances in Synthetic Chemistry

16-17 April
Edinburgh, Scotland



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Advances in Synthesis Techniques and Technologies

Keynote Presentation Synthesis of Cell Delivery Agents

Mark Bradley, Professor, University of Edinburgh

Approaches to the Total Synthesis of Some Biologically Active Natural Products

Jim Thomas, Professor, Manchester University
Stereoselective procedures for the synthesis of compounds with methyl groups at 1,5,9, 13- and 1,3,5,7--positions down unfunctionalised aliphatic chains will be described together with approaches to some complex biologically active natural products including phomactin A and bryostatins.

The Big Leap - Turning Bench Chemistry to Full Scale Processes

Hans-Jürgen Federsel, Director of R&D, AstraZeneca

With the design of more and more structurally challenging molecules as candidate drugs, there is an ever increasing demand on Process R&D for being able to cope with their large scale preparation using safe and environmentally considerate methods at acceptable costs.

Synthesis Based on Alkenyl-hem-dichlorocyclopropanes

Semen Zlotzky, Professor, Ufa State Aviation Technical University

Flow Chemistry

Horizons in Flow Chemistry

Ferenc Darvas, President, Thales Nano
Recent progress in flow chemistry summarized: flash chemistry under regular and supercritical conditions, residence-time controlled flow chemistry, methathesis under flow conditions, a highly efficient method for deuteration in flow. Establishing kinetic and diffusion controlled areas in the reaction space by flow methods.

Scaling up of Continuous Reactors

Robert Ashe, Director, AM Technology

Keynote Presentation Continuous Flow Microreactor Chemistry Under High Temperature/Pressure Conditions

Oliver Kappe, Professor, Karl-Franzens-University Graz

Reaction conditions typical for microwave batch reactors can be mimicked in a high temperature high-pressure flow reactor. In the microtube flow device, many of the benefits inherent to microwave chemistry such as rapid heating/cooling and sealed vessel processing can be mimicked, including the generation of solvents in their supercritical state.

The Big Leap - Turning Bench Chemistry to Full Scale Processes

Michael Greaney, Professor, University of Edinburgh

With the design of more and more structurally challenging molecules as candidate drugs, there is an ever increasing demand on Process R&D for being able to cope with their large scale preparation using safe and environmentally considerate methods at acceptable costs.

Continuous Flow Microreactors for Heterogeneously Catalyzed and High Pressure Reactions

Willen Verboom, Associate Professor, University of Twente

Catalyst-functionalized brushes as a coating of the inner wall of glass micro-reactors give rise to considerable rate enhancements compared to lab scale. Another interesting application of microreactors is their use at high pressures, without the need for strict safety regulations.

Microwave-Assisted Organic Synthesis

Rapid Microwave-Assisted Isoourea-mediated Synthesis of Carboxylic Esters

Bruno Linclau, Senior Lecturer, University of Southampton

The rapid microwave-assisted isoourea-mediated formation of carboxylic esters in both solution and solid phase is described, and includes the successful demonstration of clean inversion of configuration when isooureas derived from secondary alcohols are used.

A Potpourri of Recent Microwave-assisted 2(1H)-pyrazinone Chemistry

Erik Van der Eycken, Professor, University of Leuven

Microwaves in the Synthesis of Helically Chiral Aromatics

Irene Stara, Project Leader, Institute of Organic Chemistry and Biochemistry Prague

In this presentation we will show how we have developed a general methodology for the synthesis of helicenes based on single or multiple [2+2+2] cycloisomerisation of aromatic alkynes providing [5] - [11]helicenes. Microwave irradiation was applied in the key cyclotrimerisation as well as final aromatisation steps.

Continuous Flow Microreactors for Heterogeneously Catalyzed and High Pressure Reactions

Wolfgang Rapp, CEO, Rapp Polymere

All investigated examples show clearly that synthesis performed under microwave irradiation give no benefit over synthesis performed with conventional heating. In all cases, microwave irradiation has only a thermal effect.

Hazardous Nitration using Microreactor-From Laboratory to Production

Mehul Tathagar, Research Scientist, DSM

Improving Organic Synthesis by Exploiting Flow Reactor Technology

Paul Watts, Senior Lecturer, University of Hull

In this presentation a number of chemical reactions of industrial interest will be used to illustrate the advantages that flow reactors offer for the rapid optimisation of reactions, in which the product is typically produced in both higher yield and purity. It will be illustrated that compounds may be prepared and purified within an integrated system and that it is possible to generate intermediates in situ within the reactor, which may then be subsequently reacted to produce more complex products. More recently the incorporation of solid supported reagents and catalysts has been investigated and the results will be discussed. The use of solid supported reagents adds even greater diversity to the range of reactions that may be achieved within such systems. It will be demonstrated that the dimensions of reactors may be increased in size while maintaining the classic advantages associated with miniaturisation. In such systems significant quantities of analytically pure compound may be prepared without additional purification.

Complex Target Synthesis Using Reactive Metal Carbenoids

Stephen Clarke, Professor, Glasgow University

The lecture will focus on the rapid construction of complex polycyclic structures using the reactions of copper and rhodium carbenoids and the rearrangement of highly reactive intermediates generated from them. The application of this methodology to the total synthesis of bioactive natural products will be discussed.

Microwave-Assisted Organic Synthesis

Keynote Presentation

From Batch to Flow: New Methods in Microwave-assisted Synthesis

Mark Bagley, Senior Lecturer, Cardiff University

Microwave Mediated Protocols Towards Calixarene Elaboration & Structure Diversification

Sean Bew, Senior Lecturer, University of East Anglia

The application of microwave irradiation allows the efficient synthesis of calixarenes to be undertaken and the efficient structural elaboration of the upper-rim of the calix[4]arene macrocycle with for example amino acids, carbohydrates and fluorophores.

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