Chemical Development & Scale-Up in the Fine Chemical & Pharmaceutical Industries

Principles and Practice

25 - 27 October 2010

The Renaissance Seattle Hotel

Seattle, WA, USA

SCIENTIFIC UPDATE

We've Got Chemistry

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Course Objectives

To train R&D chemists and engineers in the most efficient methods for developing cheap, robust processes for the manufacture of fine organic chemicals in the minimum amount of time.

To educate chemists in the principles of scale-up and development, in basic engineering concepts and in techniques for the optimisation of processes.

To teach chemists to learn from the experience (and mistakes) of others by examining case studies from industry.

Fee

£1225.00 including lunch & refreshments, course dinner and course manual.

Course Introduction

Chemical process development is generally not taught as part of degree courses in higher education; the conversion of a synthetic route used for making milligram or gram quantities of a chemical into a process for manufacturing multi-kilogram and tonne quantities is typically learnt "on the job" by chemists in industry. For many years, little chemical development work was published in the literature, until the establishment of the Organic Process R & D journal by Dr Trevor Laird (Founder of Scientific Update). Even now, "tricks of the trade" are handed down within individual company organisations, and it can be difficult to gain an awareness of what is involved in chemical development, and of the skills and techniques required to efficiently scale-up chemical processes.

This three-day course, written and presented by highly experienced process chemists from the pharmaceutical and fine chemical industries, provides a comprehensive overview of this fascinating and important element of the chemical industry. A logical investigative approach to all aspects of chemical development is described, with an abundance of case studies from literature, conferences and private communications. The multi-disciplinary nature of chemical development is emphasised, from the initial interaction with laboratory research scientists to the vital partnership with chemical engineers in the pilot plant and in the production environment. The lectures are interspersed with interactive problem sessions, enabling participants to share in the problem solving and troubleshooting typically experienced during chemical development.

Course Outline

Introduction
- The purpose of chemical development

Synthetic Route Discovery
- Route design
- Selecting the best route for scale-up
- Choice of raw materials, reagents etc

Costing of Chemical Processes
- Raw materials
- Overheads
- Context

The Investigative Approach to Chemical Development
- Optimising Chemical Reactions
- Making processes robust
- Minimising scale-up difficulties

Solvent Effects
- Often overlooked
- Key to making a modest process a great process

Statistical Methods of Optimisation
- Vital, but under-utilised
- Design of Experiments
- Simplex
- Factorial design

Analytical Issues
- In Process Control
- Quality Control and Specification Setting
- Regulatory Guidelines
- GMP, Validation
- Use of analysis to aid process optimisation

Work Up
- Product isolation

Planning for Scale-Up
- Key points to consider

Appreciation of Chemical Engineering Principles
- Mass Transfer
- Mixing
- Heat Transfer
- Kinetics

Crystallisation and Polymorphism
- Particle size control
- Polymorph control
- Methods of analysis

Chemical Development of Enantiomerically Pure Compounds
- Resolution
- Chemocatalysis
- Biocatalysis
- Crystallisation-induced asymmetric transformations

Thermal Hazard Testing and Runaway Reactions
- Essential process safety considerations
- Equipment and screening approaches

Effluent Minimisation and Control
- Environmental considerations
- Cost considerations
- Green chemistry

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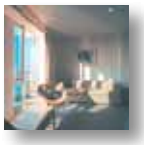
"I enjoyed the Course and would recommend it."
Array Biopharma

Tutors

Will Watson gained his PhD in Organic Chemistry from the University of Leeds in 1980. He joined the BP Research Centre at Sunbury-on-Thames and spent five and a half years working as a research chemist on a variety of topics including catalytic dewaxing, residue upgrading, synthesis of novel oxygenates for use as gasoline supplements, surfactants for use as gasoline detergent additives and non-linear optical compounds. In 1986 he joined Lancaster Synthesis and during the next 7 years he was responsible for laboratory scale production and process research and development to support Lancaster's catalogue, semi-bulk and custom synthesis businesses. In 1993 he was appointed to the position of Technical Director, responsible for all Production (Laboratory and Pilot Plant scale), Process Research and Development, Engineering and Quality Control. He helped set up and run the Lancaster Laboratories near Chennai, India and had technical responsibility for the former PCR laboratories at Gainesville, Florida. He joined Scientific Update as Technical Director in May 2000. He is also involved in an advisory capacity in setting up conferences and in the running of the events. He is active in the consultancy side of the business and sits on the Scientific Advisory Boards of various companies. He can be contacted by email at: will@scientificupdate.co.uk

Derek Robinson gained his PhD in Physical Organic Chemistry from the University of St. Andrews in 1981. After completing two years post doctoral research at the University of Strathclyde, he joined the Pharmaceutical Research and Development group at Parke-Davis/Warner Lambert. During the next eleven years he was responsible for the development and optimisation of synthetic routes to novel drug candidates, organising the scale-up to pilot plant and transfer to production facilities. He was manager of synthetic chemistry laboratories at Pontypool, Wales and Freiburg, Germany. Since 1995 he has been an associate lecturer at Scientific Update. Derek has developed courses on Good Manufacturing Practices (GMP), Basic Organic Chemistry for Chemical Engineers and Statistical Experimental Design for Chemists. He also tutors the Chemical Development in the Fine Chemical and Pharmaceutical Industries course. He has also worked with fine chemical companies to help develop documentation procedures and GMP training courses. He can be contacted by email on derek@kolvox.net

Venue



Renaissance Seattle Hotel
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Seattle
Washington 98104, USA
Tel: 001 206 583 0300 Fax: 001 206 624 8125
www.marriott.com/hotels/travel/seasm-renaissance-seattle-hotel

The Renaissance Seattle Hotel is located in downtown Seattle and situated just 20 minutes from Seattle-Tacoma Airport.

A limited number of rooms have been reserved at the hotel for the special rate of $179 per night for a single/double occupancy room – plus local taxes. Please note there is a cut-off date of 1 October 2010 for this rate.

Reservations are to be made by yourself, directly with the hotel. Full details of how to book a hotel room will be sent when you register.

General Information

The course begins with registration at 8.30am on Monday 25 October and finishes at approximately 3pm on Wednesday 27 October. There is a course dinner for all attendees on Monday 25 October.

The organisers reserve the right to change the published programme of events and course content as circumstances dictate.

Who Should Attend?

Young Chemists who have just started work in industry as development chemists.

Organic Chemists/Medicinal Chemists in Research and Development who would like to gain an appreciation of development and scale-up and who are perhaps contemplating moving into chemical development.

Development and Production Chemists in industry who would like to improve their efficiency and gain an insight into alternative approaches to chemical development.

Chemical Engineers who wish to understand a chemist's approach to chemical development of batch processes. (Engineers would, however, need a good grounding in organic chemistry.)

Students who are about to enter the industry and can obtain company sponsorship.

Experienced Chemists looking to refresh and/or augment their knowledge of chemical development.

Analytical Chemists who wish to gain a broader appreciation of process chemistry.

Managers who might benefit from a comprehensive and up to date overview of chemical development.

At the end of the Course, participants will have gained

A logical investigative approach to chemical development and optimisation

An insight into the factors involved in scale-up

An appreciation of chemical engineering concepts, particularly mixing, heat transfer and process control

A preliminary knowledge of statistical methods of optimisation

Improved ability to decide which parts of the chemical process to examine in detail

Ideas for efficient resource allocation

Improved troubleshooting and problem solving ability

Scientific Update Training | Course Registration

Chemical Development & Scale-Up in the Fine Chemical & Pharmaceutical Industries

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For late applications please register on line at **www.scientificupdate.co.uk** or fax the completed registration form, including credit card payment information.

Venue/Accommodation You will be sent details of how to reserve your accommodation with your event confirmation details.

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