Monday 11 May 2020

Basic Science and understanding

09:00  Registration and coffee
09:30  Welcome and housekeeping
       Dr Jim Bullock, iFormulate Ltd
09:40  **Introduction to fluid bed processing**
       Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)
       - Overview and key features of fluid bed processing and key features
       - Objectives of processing and how/where it is used
       - Fluid bed designs – pros and cons
       - What can happen if it goes wrong
       - Introduction to the key scientific topics of the course
10:10  **Fluidisation basics**
       Professor David York, University of Leeds (formerly of Procter and Gamble)
       - Basics of fluidisation.
       - Particle properties, disengagement zone, elutriation, pressure drops
       - Includes a demonstration
       - Safety
11:15  Coffee
11:30  **Benefit of mass transfer in the fluid bed**
       Professor Andrew Bayly, University of Leeds (formerly of Procter and Gamble)
       - Drying and cooling operations
       - The importance of particle properties and interactions with the fluid bed
12:10  **Particle agglomeration in fluid beds**
       Dr Stephan Sternowsky, Neuhaus Neotec
       - Examples which illustrate the science of agglomeration
12:50  Lunch
13:50  **Hands-on laboratory demonstration sessions**
       **Demo a: Agglomeration and sintering**
       Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds
       **Demo b: Fluidisation and Geldart classifications**
       Soyeb Manga, University of Leeds
       **Demo c: Continuous and batch operation**
       Professor David York, University of Leeds
15:35  Tea
15:50  **Fluid atomisation in fluid beds – basic science mechanisms**
       Phil Threlfall-Holmes, TH Collaborative Innovation & Visiting Professor at the University of Leeds (formerly of AkzoNobel)
16:30  **Use and characteristics of twin fluid nozzles in fluid beds**
       Stefan Gerstner, Schlick
17:00  **Importance of powder material properties in fluid beds**
       Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds
       - Geldart classification
• Impact of size distribution, moisture and temperature
• Characterisation
• Causes and consequences of unintended agglomeration

17:30 Q&A and wrap up
17:45 End of day one
19:00 Course Dinner

Tuesday 12 May 2020
Applications and case studies

09:00 Coffee
09:15 Welcome
  Dr Jim Bullock, iFormulate Ltd
09:20 Basics of fluid bed design
  Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds
  Influence of shape, distributor plates, weirs, air distribution, static and vibratory beds
  • Wurster design
  • Continuous vs batch operation
  • Cyclones, internal filters
10:00 Basic modelling for fluid bed processing
  Dr Ali Hassanpour, University of Leeds
  • DEM and CFD Models
  • Heat balance
10:40 Coffee
10:55 Hands-on laboratory demonstration sessions
  Demo d: Particle mixing, separation and attrition
  Professor David York, University of Leeds
  Demo e: Spouted bed
  Nigel Somerville Roberts, NSR Innovations Ltd (formerly of Procter and Gamble) and visiting researcher, University of Leeds
  Demo f: Encapsulation and coating
  Veerle Timmerman, Xedev/ProCept
12:40 Lunch
13:30 Fluid bed drying – mechanistic modelling and scale-up
  Ian Kemp, Consultant (previously GSK)
14:10 How liquids spread, coat or agglomerate in fluid bed processing
  Professor Nik Kapur, University of Leeds
  • Mechanisms of wetting and spreading
  • Impact of shape and liquid properties
14:50 Operation: start up and shut down and handling difficult materials
  David Smith, DJS Process Consulting Ltd (formerly of Procter and Gamble)
15:30 Tea
15:45 Case studies of continuous and batch operation
  Henning Falck, Neuhaus Neotec
  • Pros and cons of continuous vs batch
16:10 Powder morphology and powder performance - case study food 1: three-in-one coffee mix
  Tobias Kockel, Nestlé R&D Konolfingen, Switzerland
16:35 Particle engineering and characterisation of output particles
  Lieselotte de Smet, Xedev/ProCept
17:00 Trouble shooting forum/expert consultation session, Q&A and networking drinks reception
18:00 End of day two
Wednesday 13 May 2020

Applications and case studies cont.....

09:00 Coffee

09:15 Welcome
Dr Jim Bullock, iFormulate Ltd

09:20 Powder morphology and powder performance - case study food 2: thicken-up clear
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

09:50 Case study – fluid bed granulation modelling and scale-up
Ian Kemp, Consultant (previously GSK)

10:30 Coffee

10:45 Case Study: particle coating and controlled release
Barry Friend, Colorcon

11:25 Case Study: combining spray drying with a fluid bed
Professor David York, University of Leeds and Nigel Somerville Roberts, NSR Innovations Ltd

Expanding understanding and application of fluid beds

12:05 Innovation example 1 - academic - structured fluid beds: towards more responsive processes
Dr Victor Francia, Heriot-Watt University

12:45 Lunch

13:35 Instrumentation and control: sensors, soft sensors and control loops
Tobias Kockel, Nestlé R&D Konolfingen, Switzerland

14:15 Innovation example 2 – industry – high gravity fluidized beds
Prof. Dr. ir. Juray De Wilde, Université Catholique de Louvain (UCLouvain)

14:55 Tea and end of course