

Powder Characterisation: Chemical, Physical and Mechanical Properties
Tuesday 15 – Thursday 17 May 2018

Programme

Course Directors: Professor Mojtaba Ghadiri and Dr Mehrdad Pasha
School of Chemical and Process Engineering, University of Leeds

Tuesday 15 May 2018

Characterisation of Physical Properties of Particles

09:00 *Registration and Coffee*

09:30 **Introduction**

Professor Mojtaba Ghadiri, University of Leeds

10:00 **Sampling and sample preparation for particle characterisation**

Professor Mojtaba Ghadiri, University of Leeds

- Origins of problems in particle property analysis
- Sampling from particulate systems
- Sample preparation

10:45 *Coffee*

11:10 **Particle size analysis**

Dr Tina Bonakdar, University of Leeds

- Principles of size analysis
- State-of-the-art instruments for particle sizing

12:40 *Lunch*

13:25 **Particle shape and structure characterisation**

Dr Mehrdad Pasha, University of Leeds

- Shape and shape description
- Surface morphology and structure
- Application to density determination

14:25 **Suspension rheology**

Dr David Harbottle, University of Leeds

- Introduction to the principles of suspension rheology
- Particle structuring in suspensions
- Measurement of suspension rheology

15:55 *Tea*

16:15 **Bulk flow of powders**

Professor Norman Harnby, University of Bradford

- Cohesive and free-flowing powders
- Segregation and structure
- Application of characteristics to process design

17:45 *End of day one*

19:00 *Course Dinner*

Wednesday 16 May 2018

Characterisation of Mechanical Properties of Particles

09:00 **Mechanical properties of powders**

Professor Mojtaba Ghadiri, University of Leeds

- Introduction to mechanical properties of powder
- Characterisation of deformation and breakage of particles
- Characterisation by nano-indentation
- Particle breakage under brittle and semi-brittle failure modes
- Impact and side crushing of single particles
- Bulk compression and crushing

10:30 *Coffee*

10:55 **Bulk characterisation of powders**

Dr Colin Hare, University of Surrey

- Shear cells and powder rheometry
- Frictional properties
- Consolidation and unconfined yield stress

12:25 *Lunch*

Wednesday 16 May 2018 continued..

Characterisation of Mechanical Properties of Particles

13.10 Electrostatics in powder systems

Professor Mojtaba Ghadiri, University of Leeds

- Fundamentals of tribo-electrification of powders
- Measurements of tribo-electrification of powders
- Industrial applications of electrostatics in powder systems

14:40 Tea

15:00 Powder characterisation practical demonstrations (Laboratories)

17.30 *End of day two*

Thursday 17 May 2018

Characterisation of Chemical Properties of Particles

09:00 Adhesion

Dr Umair Zafar, University of Leeds

- Principles
- Measurement techniques
- State-of-art in the field

10:15 *Coffee*

10:40 Solubility and dissolution of particles

Dr David Berry, The Centre for Process Innovation (CPI)

- Principles
- Applications

12:10 *Lunch*

13.55 Tableting and compaction of powders

Dr Csaba Sinka, University of Leicester

- Fundamentals of tableting and compaction of powders
- Industrial use of tableting and compaction

14.25 *Tea*

14.45 Determination of Powder Surface Energy and Surface Chemistry

Dr Jerry Heng, Imperial College London

- Principles
- Applications to powders

16:15 *End of day three and course*