

Powder Characterisation: Chemical, Physical and Mechanical Properties
Tuesday 12 – Thursday 14 May 2020

Provisional Programme

Course Director: Professor Mojtaba Ghadiri
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Tuesday 12 May 2020

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 David Scott, Advanced Particle Sensors LLC, USA

- 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 Rammile Ettelaie, 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*

17:45 *Networking Drinks Reception and Poster Session*

Wednesday 13 May 2020

Characterisation of Mechanical Properties of Particles

08:30 **Mechanical properties of powders**

Dr Sadegh Nadimi, Newcastle University

- 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

10:00 *Coffee*

10:15 **Bulk characterisation of powders**

Dr Colin Hare, University of Surrey

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

Wednesday 13 May 2020 continued

11:45 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

13:15 *Lunch*

14:00 Powder characterisation practical demonstrations (Laboratories)

- a. Lab B13: Nanoindentation and Malvern Mastersizer
- b. Lab 2.14: Schulze Shear Cell
- c. Lab B13a: Freeman FT4
- d. Lab 201: XRT and G3 Morphology

16:15 *Tea*

16:30 Adhesion

Dr Umair Zafar, Novartis, Switzerland

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

17:45 *End of day two*

19:15 *Course Dinner*

Thursday 14 May 2020

Characterisation of Chemical Properties of Particles

09:00 Determination of powder surface energy and surface chemistry

Dr Jerry Heng, Imperial College London

- Principles
- Applications to powders

10:30 *Coffee*

10:45 Tableting and compaction of powders

Dr Csaba Sinka, University of Leicester

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

12:15 *Lunch*

13:00 Solubility and dissolution of particles

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

- Principles
- Applications

14:30 *End of day three and course*