

**Powder Characterisation: Chemical, Physical and Mechanical Properties**  
**Tuesday 16 – Thursday 18 May 2017**

**Programme**

Course Directors: Professor Mojtaba Ghadiri and Dr Vincenzino Vivacqua  
Institute of Particle Science and Engineering, University of Leeds

**Tuesday 16 May 2017**

**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*

11:00 **Particle size analysis**

Dr Tina Bonakdar, University of Leeds

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

12:30 *Lunch*

13:30 **Particle shape and structure characterisation**

Dr Mehrdad Pasha, University of Leeds

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

14:30 **Suspension rheology**

Dr David Harbottle, University of Leeds

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

16:00 *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 17 May 2017**

**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*

10:45 **Bulk characterisation of powders**

Dr Colin Hare, University of Surrey

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

12:15 *Lunch*

13:15 **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

14:45 Tea

15:00 Instrument demonstrations

18:00 *End of day two*

**Thursday 18 May 2017**

**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*

10:30 **Solubility and dissolution of particles**

Dr David Berry, Durham University

- Principles
- Applications

12:00 *Lunch*

13:00 **Tabletting and compaction of powders**

Dr Csaba Sinka, University of Leicester

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

14.30 *Tea*

14.45 **Determination of Powder Surface Energy and Surface Chemistry**

Dr Jerry Heng, Imperial College

- Principles
- Applications to powders

16:15 *End of day three and course*