PARTICLE CHARACTERISATION INTEREST GROUP

RSC | Advancing the Chemical Sciences

Analytical Division

PARTICLE CHARACTERISATION INTEREST GROUP NEWSLETTER

December 2006

FORTHCOMING MEETINGS

Training Meeting on Particle Size Measurement
(Certificate of Training for Professional Development Provided)

At LGC,
The Heath Business Park, Runcorn
Cheshire, WA7 4QX
Wednesday 21st March 2007

Particle Sizing is but one task undertaken within modern analysis laboratories. Such laboratories also experience quite a high turnover of people in order to further the career paths of the staff, and it is not always possible for the outgoing staff to pass on their experience and knowledge to the newcomers.
This training day, provided by some of the most experienced members of the Particle Sizing community, aims to offer a comprehensive and practical view of the measurement of particle size distributions.
It will focus on the techniques of laser diffraction, dynamic light scattering, (photon correlation spectroscopy PCS), electrozone sensing and sieving. It will also cover sampling, dispersion, presentation of results and current standards and certified reference materials. Particular attention will be paid to the pitfalls that may be encountered. Comprehensive notes will be provided together with a certificate of training.

The programme and registration form is included with this newsletter. Further information can be obtained from Mrs Nicki Tonkinson, PCIG, c/o Particle Technology Ltd, Units 1 & 2, Station Yard Industrial Estate, Hatton, Derbyshire DE65 5DU. Tel 01283 810091 Fax 01283 520412 E-mail particles@btconnect.com

UK-CHINA PARTICLE TECHNOLOGY FORUM
1-3 APRIL 2007
UNIVERSITY HOUSE, UNIVERSITY OF LEEDS, UK

The second announcement and registration form is included with this newsletter. Further information can be obtained from Dr Yulong Ding at University of Leeds. Tel: 0113 343 2747 E-mail: y.ding@leeds.ac.uk

PowdermatriX and the Particle Characterisation Interest Group are pleased to announce a co-badged seminar

Additives for Powder Processing
At Pride Park Stadium, Derby DE24 8XL
Wednesday 13th June 2007

Further information is included at the back this newsletter and the full programme and registration form will be available early in the New Year.

Meeting of the Particle Characterisation Interest Group (PCIG) of the Royal Society of Chemistry co-badged with PowdermatriX held at Pride Park Stadium, Pride Park, Derby on 13th September 2006.

"Measurement and Control of powder Flow"

Nayland Stanley-Wood and Richard Holdich

In a previous particle characterisation meeting held in conjunction with PowdermatriX, the emphasis was on the various techniques and commercially available instrumentation to measure the particle size and particle size distribution of the multitude of powdered materials produced, either as industrial intermediates or final - customer acceptable - powders.
This time the co-badged meeting of PCIG and PowdermatriX on the 'Measurement and Control of Powder Flow', at Pride Park, brought together experts from the arena of particle and powder characterisation and a network of industrial, professional and academic organisations who wished to further the understanding and consensual knowledge on bulk powder flowability.
One of the difficulties generally experienced by powder process engineers, powder handling operatives and most technical personnel within the chemical, pharmaceutical, ceramic, metallurgic and bio-chemical industries, is to ensure that bulk powders have the ability to flow freely from one position to another. Thus this full day meeting, to an audience of around 50 delegates, two morning sessions and an afternoon session covered the measurement of powder shear, as measured by various shear cells and rheometer-like flow-ability meters, the prediction of powder flowability properties from parameters such as, Hausner ratios, Angles of Repose, Compressibility indices and bulk powder densities together with the introduction of a newly proposed initiative towards the standardisation of protocols envisaged of the industrial testing and measurement of particle size and shape.

The first presentation was from Mike Bradley, of The Wolfson Centre for Bulk Solids Handling Technology. Mike's talk set the scene and was very much an audience participation event, complete with three volunteers assisting in some on-the-spot uniaxial shear testing of a powder Mike had brought along for the purpose. The powder was mixed with three different volumes of water and the influence of moisture on the strength of the powder, under different consolidating loads, was demonstrated and a compressive strength with consolidating load diagram produced. Mike's introductory lecture covered the fundamentals of core and mass flow, correctly interfacing hoppers to discharge chutes and the proverbial hopper hammer rash, and how to avoid it.

Mike was followed by Rob Berry, also from the Wolfson Centre, who spoke about measuring powder flowability and in particular the annular shear cell which is being adapted for flowability testing by The Centre. Rob provided details of how the results may be influenced by the geometric factors of the cell and there was some discussion on the number of vanes in the cell lid gripping the powder and their size.

A commercial device for measuring powder flowability was described by Mark Crooks, from TSI, who discussed the principles behind the Model 3250 Aero-Flow powder flowability analyzer. The instrument arose from work performed by Brian Kay of Laurentian University and became part of the TSI portfolio in 1998. The main operating principle is analysing powder cascade as the powder, within a thin rotating drum, falls under the influence of gravity. The instrument uses a light source and detector to measure the powder movement and a series of saw-tooth plots are given by the detector. The periodicity and shape of the plots provide information on flowability. Mark then went on to describe the 'Strange Attractor' plots arising from the data, based on the time taken between the powder tumbles. The more scattered the data on a Strange Attractor plot the more cohesive the powder is deemed to be. Mark ended with a range of Frequently Asked Questions and Answers, but explained that the instrument is soon to be removed from production by TSI. However, he was hopeful that it could re-enter production, or be taken up by another supplier.

The presentation before coffee was by Dietmar Schulze, University of Applied Sciences Braunschweig, Wolfenbuttel, Germany; and Scientific & Medical, Cheadle UK. Dietmar reviewed the representation of powder cohesiveness data on the Mohr's circle and the resulting Powder (Material) Flow Function. He discussed the developments in ring shear testers since 1992 and the efforts taken to remove operator influence on the result. Thus, the modern generation of Ring Shear Testers are computer controlled and

capable of measuring small stresses as well as powders requiring large shear deformation. The Scientific & Medical Schulze Ring Shear Tester now has an ASTM (D6773-02) for bulk solids testing.

The last three morning presentations emphasised the lack of universal powder parameters currently available, from laboratory bench measurements, to predict the nature of powder flow expected and observed on plant.
Eddie McGee, of Ajax Equipment Ltd, Bolton eddie@ajax.co.uk ['The influence of equipment design on powder flow] presented an industrial overview of the flow problems experienced in the handling of bulk semi-cohesive and cohesive powders. 'Easy', 'Average' and 'Poor' flow of powders could be visualised by the construction of a six pointed 'Spider's Web. The six points or powder flow factors, used in the construction of the diagram, were wall friction, hopper wall angle, shear strength, critical outlet size, Hausner ratio and bulk density.
Over 100 industrial powders had been tested and the degree of 'fill' within the 'spider's web' gave an indication of the degree of flowability to be expected. A small area of fill or a full area of fill gave a correlation between 'easy' and 'poor' flowability respectively.
Rob Forbes, of the School of Pharmacy, University of Bradford R.T.Forbes@Bradford.ac.uk [Pointers to progress in predicting powder flow: A Pharmaceutical Perspective], stated that the US Pharmacopoeia identifies four methods for the characterisation of the flow of pharmaceutical powders; these are angle of repose, Hausner ratio, flow rate through an orifice and shear-cell techniques.
The reliability and reproducibility of two different approaches in the measurement of shear and therefore the flowability of cohesive and non-cohesive pharmaceutical excipients used in tablet production were presented. It was found that the Powder Flow Analyser, a rheometer-like shear cell, from Stable Microsystems. UK was better when cohesive powders were handled and tested, whilst the powder avalanche test, developed by the late Brian Kaye, Laurentian University, Canada [Aero-Flow, TSI Instruments Ltd., High Wycombe, UK] readily distinguished the amount free flow seen with industrial free flowing, non-cohesive pharmaceutical powders.

Although the conveying, flow and handling of powders are of importance, of equal prominence in bulk powder technology is the operation of fluidisation which can be observed in industrial processes ranging from pharmaceutical granulation and mixing to catalytic cracking and petroleum production.
In the last presentation of the morning, Paola Lettieri, Fluidisation Research Group, Dept. Chemical Engineering, University College London. UK] < p.lettieri@ucl.ac.uk > [Challenges in CFD modelling of dense multiphase systems] illustrated the pitfalls of current correlations available to solve the drag forces acting on a suspension of particles. There is a need to relate the differences between incompressible and isothermal Newtonian fluid velocities and particle velocities in terms of the physical properties of the fluid (density and viscosity), physical properties of the powdered particles and the voidage of the fluidised bed. The proposed Mazzei-Lettieri correction function, which accounts for the presence and particle-particle interaction properties of the solid phase, showed excellent voidage prediction, over a wide range of Reynolds Numbers and voidages, compared to the models of Richardson-Zaki, Wen-Yu and Ergun
After lunch Ken Mingard of National Physics Laboratory (NPL) < Ken.Mingard@npl.co.uk > [Measurements for enhanced process control in advanced powder-route materials] outlined two new, NPL managed, three year 'Processing Programme 2005-8' projects; Powder sizing evaluation and Cracking in green bodies. The Powder sizing project, in conjunction with CERAM, Institute of Particle Science and Engineering, University of Leeds and Particle Technology Ltd., will, by the use of Round Robins, aim to determine the sensitivity of measurements in terms of sample preparation, differences inherent in a range of instruments, repeatability, and reproducibility for sub-sieve powders in the range of 10 to 0.5 micrometre. The five powders selected are two silicas of different particle size, calcium carbonate, a metal powder (possibly nickel) and a hard metal powder (possibly tungsten carbide). The instruments to be chosen will use the techniques of laser diffraction, electrozone sensing, X-ray sedimentation and image analysis. For this project to be viable and informative, for the bulk powder handling industries, round robin participants are required who, hopefully prior to particle measurements, will access the vast information published by the International Standards Organisation in Geneva.
The final presentation, prior to a discussion session to conclude this meeting, was by Xiaodong (Ja) Jia of the Institution of Particle Science and Engineering, Leeds and in association with Structure Vision Ltd., < X.Jia@leeds.ac.uk [DigiPac and potential applications to powder flow], who outlined a computer program, DigiPac, which could digitise, from a particle image via a collection of pixels, both the size and shape of an assembly of particles. Incorporation of digitised particle size and shape data into two and three dimensional lattice Boltzmann models were used to 'computer predict' the packing and the flow of fluids through packed beds and porous media. DigiPac has now undergone further evolution to allow

digitised particles to be attributed with relative motion, which can thus be used to indicate the possible degrees of segregation of various sized and shaped particles due to vibration. On the assumption that inter-particle and externally applied forces can be 'mimicked' by computer generated relative particle motion, DigiPac should be able to show and predict the qualitative trends of bulk powder flowability.

A CD of all the Power Point presentations given in the 'Measurement and Control of Powder Flow' meeting is to be posted to delegates and may be purchased from the Particle Characterisation Interest Group, c/o R Buxton, Particle Technology Ltd. Hatton, Derbyshire DE65 5DU. Email particles@btconnect.com

The final discussion session ranged over both the measurement of bulk properties, as presented at the meeting, and the characterisation of the micro-properties of size, shape and surface of particles. Although it was conceded that measurements for the design of hoppers and hopper outlets required measurement of shear and the application of Jenike angle of friction, hopper wall friction and unconsolidated failure stress, these factors were not always essential in the characterisation for the flow of industrial powders. The Jenike shear factors were, however, needed to achieve the construction of hoppers for mass flow, as opposed to plug flow. The flowability of bulk powders for other sections of plant may be assessed from empirical instrumentation other than shear cell tests. It was soon realised that although information on empirical methodologies for bulk flow of powders, as well as micro-particle characterisation, was available from past and in the present open technological literature, quality control in many industrial plants and laboratories had made, and makes, only merge use of such an abundance of knowledge.
It was therefore concluded that this co-badged meeting of PCIG and PowdermatriX had been very successful and warranted repeating.

Abstracts from the meeting of the Particle Characterisation Interest Group (PCIG) of the Royal Society of Chemistry held at the Coventry Transport Museum on 22 November 2006.

"Dispersed Products in Pharmaceutical and Chemical Processing"

Measuring and predicting colloidal stability- theory, technique and instrumentation

Professor Malcolm J. W. Povey, University of Leeds

The stability of colloidal and fluid/particle dispersions is of increasing importance to industry. The driver is increasing pressure from the market, both in terms of the raw materials input to existing formulations and in terms of product innovation. It is increasingly difficult to justify long development and testing times, and manufacturers seek rapid assessment of stability.

There are two essential requirements for the successful prediction of colloidal stability: (a) a model and (b) techniques and instrumentation appropriate for the capture of data for the model. Tanaka in a series of papers presents a theoretical model that describes phase separation, the development of anisotropic forces over different scales; together with the temporal and spatial evolution of phase separation and its associated forces.

Application of this model requires that the particles making up a colloidal dispersion be characterised, together with their interparticle forces. However, as with all models, it is not necessary to have a fully characterised/modelled system in order to derive benefit from the model and often semi-quantitative/qualitative aspects, combined with simplified modelling can be very productive.

In this talk, I critically consider Tanaka's ideas in the context of our own measurements on colloidal stability obtained using ultrasound techniques. I will also discuss the contribution of other techniques; particularly light scattering methods.

Monitoring Dispersion Stability With Light Scattering Techniques

Mike Kaszuba, Malvern Instruments Ltd.

For many industries involved in the production of particle dispersions, the long-term stability is an important characteristic of the final product. The stability of a particle dispersion will depend upon the balance of the repulsive and attractive forces that exist between particles as they approach one another. The magnitude of the electrostatic interactions between particles can be determined by measuring the zeta potential of the particle dispersion and hence zeta potential measurements can be used to predict dispersion stability. The zeta potential of a sample can be determined from electrophoresis measurements. A novel scheme using a combination of laser Doppler electrophoresis and a patented method called M3PALS will be introduced. The use of zeta potential measurements in optimizing dispersion formulations will be discussed using various application examples.

There are several techniques available for particle size characterization. However, few techniques are capable of measuring samples at high concentration. This would be advantageous as concerns of changes in sample morphology due to high dilutions would be eliminated. Dynamic light scattering traditionally requires high dilutions in order to make successful measurements. However, a novel optical arrangement called non-invasive back scatter (NIBS) will be highlighted and its ability to measure samples at high concentration will be discussed.

Techniques for the assessment of droplet size in parental emulsions

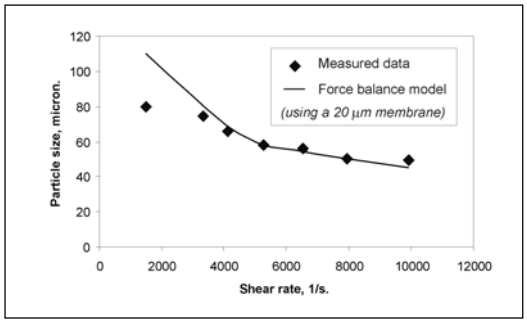
Professor Clive Washington, AstraZeneca

This talk will discuss the rigorous particle size specifications required for the formulation of emulsions for intravenous administration. Recent proposed changes to the US Pharmacopeial guidelines for assessment of this type of dose form have encouraged a deeper understanding of particle size measurement in emulsion systems, and a comparison of different measurement techniques.
We discuss the differences in results obtained with a variety of methods, relate these to scattering behaviour and show how the differences in results obtained by different methods can be rationalised.

Emulsion formation and stability using microfiltration membranes

Dr Richard Holdich, Micropore Technologies & Loughborough University.

Membrane emulsification is becoming a popular method of generating a dispersion of near monosized liquid drops within a second immiscible liquid phase. It relies upon a microfiltration membrane initially separating the two liquids, followed by the injection of one liquid into the other through the membrane. Thus, the dispersion is generated physically using the pores of the membrane rather than by the action of an emulsifying agent. A stabilising agent may still be required, in order to prevent the drops coalescing. The liquid drops may be further processed to form particles, by for example: polymerisation, crystallisation, coacervation, etc.



The membrane emulsification process is dependent on the surface chemistry and physical nature of the membrane and the liquid phases. The provision of shear at the surface of the membrane provides a method to control the drop size formed: high shear resulting in smaller drop (and particle) sizes. A fairly simple model of drop size, based on the shear stress at the membrane surface, provides a good predictive tool for the process. The example illustrated is for PVA particles formed by injecting aqueous PVA solution into kerosene containing a stabiliser, where the shear stress was obtained by vibrating the membrane in the direction of the membrane surface; i.e. parallel to the membrane surface. The model prediction comes from the force balance and the data from the particles produced.

The talk will illustrate the formation of drops (and particles) from sub-micron to millimetre sizes using the technique in the formation of products as diverse as medical diagnostics, controlled release pharmaceutical products, foods, flavourings, and resins.

Stability classification and particle sizing of suspensions by multisample analytical centrifugation

A. Uhl, L.U.M.

The properties of dispersions, i.e. dispersion stability, rheological behaviour, gloss etc. can be tailor-made by adjusting the nature and degree of interparticle forces and the particle size distribution. This requires efficient tools for a fast characterization of these properties.

The use of multisample analytical centrifugation for characterization of the colloidal stability and microstructure in aqueous and nonaqueous dispersed systems is demonstrated. This technique is also suitable for determination of the particle size distribution.
Whereas the particle size distribution obtained gives information on the primary particle size, the sedimentation kinetics and the packing density reveal information on the degree of particle aggregation and interparticle forces.
The multisample technique applied implies the potential for systematic studies for targeted dispersion properties.
The new multisample approach uses the STEP-technology. Space and time resolved extinction profiles quantify the alteration of particle concentration and packing behaviour during centrifugation without the need for sample dilution. The latter is a necessary prerequisite for ensuring that the liquid dispersions maintain their original properties.

Ink Dispersion Interactions Studied Using Inverse Gas Chromatography

F Khalifa, Ciba / University of Leeds

Thermodynamic interactions among components play a dominant role in the determination of the properties of multi-component systems, for instance, a typical printing ink formulation containing pigment, binder and solvent. One of the more important properties of a typical ink system is the dispersion property. The current presentation reports the initial work carried out to investigate the mechanisms of particle-media interactions within a typical pigment/solvent/binder system. Thus, Inverse Gas Chromatography (IGC) was used to determine the dispersive contribution to the surface energy of pigment particles. The acid/base and acid/base interaction concepts were adapted to describe the interactions between pigments, binders, and solvents. It was possible to characterise the acid/base properties of the individual components and their interactive relationship. The presentation will also report on the selected supporting techniques that were used to provide supplementary information concerning the pigments of interest, i.e. C.I. Pigment Blue 15:3, C.I. Pigment Yellow 62 and C.I. Pigment Yellow 74.

From Micro to Nano Via a Mill.

Wendy Knight, GSK

GSK has a significant number of water insoluble molecules in development. This presentation describes a method of developing these molecules for oral dosing. By taking an old size reduction technology modifying it and developing it to produce 21st century pharmaceutical products. We now have the capability to manufacture on a scale that can go from 100ml to 100's of kilo's.

Handling Nanoparticles in Complex Cosmetic Systems

Russell Elliott, P&G Beauty

Liq. Make-Up is an area of growing importance in cosmetics science. As well as improved performance in terms of coverage the consumer looks for added benefits such as moisturisation and sun protection. The authors will outline the challenge of incorporating nanoparticle sunscreens into water in silicone LMU. These systems contain many interfaces and the dispersants used tend to be non-selective so that unexpected effects may occur. Although such particles provide outstanding SPF protection their high surface area can cause them to deplete emulsifier/dispersant from other particles and/or the emulsion itself causing instability. An approach to prevent this effect is proposed based upon the use of chem. bonded fibril coatings on the nanoparticles that provide exceptional performance throughout the product lifecycle. Products based upon this approach have been successfully manufd. to plant scale with excellent stability and show great consumer acceptance.

Copies of the full presentations from both meetings are available on CD to those who were unable to attend. They are priced at £10 for each meeting and can be obtained from Mrs Nicki Tonkinson, PCIG, c/o Particle Technology Ltd, Units 1 & 2, Station Yard Industrial Estate, Hatton, Derbyshire DE65 5DU. Tel 01283 810091 Fax 01283 520412 E-mail particles@btconnect.com

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Report on ISO TC24 / SC4 meeting, Beijing 13th & 14th October 2006

(Dr Nayland Stanley Wood)

The UK delegation who assembled at the 28th meeting of ISO/TC24/SC4 held on 13-14 October 2006 at BIT International Education Exchange Building, Beijing, China, consisted of Andrew Mark, Ian Marshall, Paul Quincey, Alan Rawle, Nayland Stanley-Wood and Maurice Wedd. Unfortunately Paul was labelled as a USA delegate, which did not cause too much pleasure whilst Alan, although labelled as a UK delegate, was placed on the States bench with his mug of 'piping hot' china tea.

The progress, which was made since the last meeting, has been considerable. The International Standards Organisation, Geneva have been stressing that Work Groups [WG] must now try to maintain a reasonable strict time table for the production of current standards and as such the subcommittee [SC4] of the technical committee TC24 have been seriously active. The outcome of numerous emails and discussions towards the completion of an international standard is listed below.

The nomenclature used by ISO, in order of progression, is PWI– *proposed work item*; NWI– *new work item*. This means the work has been officially logged and time allocated to complete a final standard begins; WD – *working draft.* These drafts are produced by the WG for discussion, only in the WG, and not for public information; CD – *committee draft*. Many working drafts may be produced but the accepted draft ultimately produced by the Work Group, is placed before the whole of SC 24 for technical discussion and approval. A resolution by the SC4 committee must then be passed to send the CD to ISO, Geneva as a DIS; DIS– *draft international standard*. The standard is now placed in the hands of ISO Geneva who circulate it to the various national standards bodies for comments. The comments made, by all the national bodies, are discussed by the appropriate Work Group and any changes incorporated into the DIS prior to reaching the status of FDIS; FDIS – *final draft standard*. The FDIS may only have typographical corrections and then the ultimate status is reached when published as an ISO Standard.
These bi-yearly synopses may in the future become redundant as ISO now has an excellent web site www.iso.org/iso/en/stdsdevelopment/tc/tclist/TechnicalCommitteeList open to the public. This website lists all published ISO standards, and the standards, which are under consideration.

WG 1: Representation of analysis data. (convener Michael Stintz)
Representation of results of particle size analysis—
Part 1: Graphical representation [Published ISO 9276-1:1998/Cor : 2004]
Part 2: Calculation of average particle sizes/diameters and moments from particle size distributions [Published BS ISO 9276-2:2001] Now the subject of a 5 yr systematic review with the proposal that an alternative notation to moments be considered in the calculation of average particle size.
Part 3: Adjustment of an experimental cumulative curve to a reference model [ISO/DIS 9276-3]
Part 4: Characterisation of a classification process used for particle size analysis [Published ISO 9276-4:2001] Now the subject of a 5 yr systematic review
Part 5: Methods of calculations relating to particle size analysis using the logarithmic probability distribution [Published as ISO 9276-5:2005]
Part 6: The description and quantitative representation of Particle Shape and Morphology.
[ISO/DIS 9276-6]

WG 2: Sedimentation, classification (convener Dietmar Lerche)

Determination of particle size distribution by gravitational sedimentation methods -
Part 1: General principles and guideline [BS ISO 13317-1:2001] Now the subject of a 5 year revision.
Part 2: Fixed pipette method [BS ISO 13317-2:2001] Subjected to a corrigendum
Part 3: x-ray gravitational technique [BS ISO 13317-3:2001].

Determination of particle size distribution by centrifugal liquid sedimentation methods -
Part 1: General principles and guidelines [BS ISO 13318-1:2001] Now the subject of a 5 year revision.
Part 2 Photocentrifuge method [BS ISO 13318-2:2001].
Part 3 Centrifugal x-ray method [ISO 13318-3].
Part 4: Pipette method [ISO/DIS 13318-4: 2004].

WG 3: Pore size distribution, porosity (convener Matthias Tommes)
Pore size distribution and porosity of materials - Evaluation by mercury porosimetry and gas adsorption-
Part1: Mercury porosimetry [ISO 15901-1 : 2005]
Part 2: Analysis of meso- and macropores by gas adsorption [ISO/FDIS 15901-2]
Part 3: Analysis of micropores by gas adsorption [DIS 15901-3]

Determination of the specific surface area of solids by gas adsorption using the BET method [ISO 9277:1995] is now subject to a 5 year revision which has generated a proposed work items PWI 9277, to allow the distinction between mono layer and multilayer adsorption to be acknowledged and may be termed 'Determination of the specific surface area of solids by gas adsorption using the BET method and alternative methods'

WG 5: Electrical sensing methods (convener Billy Goransson)

Determination of particle size distribution –
Electrical sensing zone method [Published BS IS0 13319: 2000] Was subjected to a 5 year revision, now progressing to a DIS

WG 6: Laser diffraction methods (convener Ron Iacocca)

Particle size analysis - Laser diffraction methods -
General principles [IS0 13320-1:1999] Now the subject of a 5 year revision.

WG 7: Dynamic light scattering. (convener Robert Finsy)

Particle size analysis- Dynamic light scattering (DLS) [ISO 22412 part 2]
Recently published

WG 8: Image analysis methods (convener Yoshio Otani)

Particle size analysis -
Part 1: Static Image analysis methods [IS0 13322-1:2004].
Part 2: Dynamic Image analysis methods [IS0 13322-2: 2006].

WG 9: Single particle light interaction methods (convener Kazuo Ichijo)

Determination of particle size distribution- Single particle light interaction methods
Part 1: Light scattering aerosol spectrometer [ISO/DIS 21501-1]
Determination of particle size distribution- Single particle light interaction methods
Part 2: Light scattering liquid-borne particle counter [ISO 21501-2]
Part 3: Light extinction liquid-borne particle counter [ISO 21501-3]
Part 4: Light scattering airborne particle counter for clean spaces
[ISO/FDIS 21501-4]

WG 10: Small angle x-ray scattering method (convener Jinyi Chen)

Particle size analysis -
Small angle X-ray scattering method Published as ISO/TC 13762:2000 and now has a request to be upgraded to an ISO standard. UK experts are required for this work

WG 11: Sample preparation. (convener Kari Heiskanen)
Particulate materials
Sampling and sample splitting for the determination of particulate properties. [ISO/DIS 14488].
Second voting
Sample preparation -
Particle size analysis - Dispersing agents for powders in liquids.
[ISO14887: 1999].

WG 12: Electrical mobility and analysis methods. (convener Gilbert Sem)
Particle size analysis
Validation and calibration of aerosol particle number counters. [ISO/CD 15900]

WG 14: Particle characterisation by acoustic methods. (convener David Scott)
Measurement and characterisation of particles by acoustic methods
Part 1: Ultrasonic attenuation spectroscopy, [ISO 20998-1: 2006]

WG 15: Focused scanning beam techniques (convener Gregor Hsaio)
Working draft only

and on a lighter note….
The suffering of UK experts!

(Mr Maurice Wedd)

Delegates from 14 countries toil to create standards on particle characterisation other than sieving. At our last meeting in Florida the Chinese delegation cordially invited us to meet in Beijing and thus the opportunity to both attend the meeting and to see a little part of China could not be missed.
Both Nayland and I were allowed to accompany our wives. A party of 4 is ideal for the tour schedule as we could dictate the pace. Arriving 2 days before the meeting permitted time to be taken on the free days to visit the Great Wall and Ming Tombs plus the ubiquitous tour lunch and shopping experience. The visibility on this day was good with warm sunshine. Atmospheric pollution is the price being paid for rapid progress in China. We can confirm that the wall is very steep in places such that we did not envy the builders or the garrisons who trudged the ramparts. The shear scale of both venues is a marvel in it self and quite hard on the feet. Our second day saw us in Tiananmen Square followed by the Forbidden palace, tour lunch and then the Temple of peace. Another full day of tired legs and sore feet.
Braving the Beijing traffic in a taxi to attend the meeting commenced our working period. Miniscule gaps in the traffic are there to be filled instantly, regardless of approach speeds.
Our Chinese hosts generously provided a buffet dinner which was enjoyed by all.
Following meetings are proposed for March 2007, Nurnberg and October 2007 Korea.
The work being completed our small group flew to Xian the 15 century capital of China and home to the Terracotta warriors.
In 1930 Peasants digging a new well unearthed a warrior's head. International hostilities coupled with certain internal matters precluded the full excavation of the find until much later.
The Emperor who commissioned the warrior army to accompany him into the next life wished the project to be kept secret and thus he executed the 43,000 artisans who had slaved to create it. These and other harsh acts stimulated a peasant uprising that not un-naturally smashed everything the Emperor created. Thus the warriors you see today are the result of painstaking repair work. There are 3 pits each the size of a football pitch. Only one has been fully excavated thus far.
Other delights of Xian are its city walls, Drum and Bell towers used for time keeping and general information like attacks. (15th century internet).

LASER DIFFRACTION PROFICIENCY TESTING SCHEME (LDPTS)

The primary aim of the scheme is to monitor and improve measurements made using laser diffraction particle size analysers. The scheme provides laboratories with a means of independently assessing their performance using a variety of samples and enables them to demonstrate to customers and regulatory bodies, on an international basis, the validity of their results. The scheme also enables laboratories and regulatory bodies concerned with the measurement of materials for particle size to gain information on the efficacy of methods and assist in the understanding and the promotion of laser diffraction analysers for this type of analysis. LGC operates the scheme on behalf of, and under the guidance of, an independently appointed Steering Committee. For further information and application form, please contact Keith Brocklehurst at LGC.

The Brian Scarlett Scholarship Fund

For over 40 years Professor Brian Scarlett made a major contribution to the Particulate Sciences. During this period many hundreds of students of many nationalities have gained from Brian's tutoring and lively stimulation of debate. Over the years, Brian made a habit of taking with him on conference and overseas visits, as many of his students as the budget would permit and sometimes more. He reasoned that exposure to new people with other stimulating ideas would build the students character, broaden their understanding and improve their confidence. When one looks at the positions former students of Brian now command one can see that this philosophy was well founded.

We are therefore seeking to mark Brian's contribution to society and to the discipline of particle science and engineering, by setting up a ring-fenced fund that will be devoted to supporting student travel in this specific area. The fund will be administered by the Particle Characterisation Interest Group, under the umbrella of the Royal Society of Chemistry, who are experienced in this field and registered as a charity.

Initial Sponsors:

Prof Rose Amal (University of New South Wales)
Dr Judith Bonsall (Unilever)
Prof Reg Davies (Du Pont Fellow)
Prof John Dodds (Ecole de Mines)
Professor Leslie Ford
Prof Kari Heiskanen (University of Helsinki)
Prof Ko Higishitani (University of Kyoto)
Dr Sue Ion (BNFL)
Dr Nikolaas de Jaeger (President, International Fine Particle Research Institute)
Prof George Klinzing (University of Pittsburgh/AIChE)
Dr Hank Merkus (Delft TU)
Prof Brij Moudgil (University of Florida)
Prof R Pfeffer (NIJT)
Prof Wolfgang Peukert (University of Erlangen)
Prof Dr Sotiris Pratsinis (ETH)
Mr Maurice Wedd (Malvern Instruments)
Prof. Richard Williams (University of Leeds)

Further Information can be obtained from:

The Administrator of The Brian Scarlett Scholarship Fund, c/o PCIG, Station Yard Industrial Estate, Hatton, Derbyshire, DE65 5DU UK, Tel: +44 (0) 1283 810091 Fax: +44 (0) 1283 520412.
Email particles@btconnect.com

Bursaries

PCIG AWARDS in the form of bursaries, which may be up to £250.00 each, are available to student members of the Particle Characterisation Interest Group of the RSC in order to attend Conferences.
GENERAL BURSARY AWARDS: Consideration will be given on a case by case basis to full Particle Characterisation Interest Group members who by the receipt of such a bursary may make a contribution for the benefit of the particle characterisation community that would otherwise not be possible. These may be for travel expenses etc for attending conferences or standards meetings. The applicant must have been a full member of the PCIG for at least 1 year. Further information on either of these awards can be obtained from the Secretary

Thank you to Toni Lilly

The PCIG committee has recently been informed that due a change in position, away from powder technology, Mrs Toni Lilly (AWE Aldermaston) has had to resign from the Committee. The Chairman and committee of the PCIG wish to thank Toni for her enthusiastic contribution to the particle characterisation community and wish her every success in the new role.

Further Information

For further information on meetings or the group, please contact:
Mrs Nicki Tonkinson, Particle Characterisation Interest Group
c/o Particle Technology Ltd, Units 1 & 2, Station Yard Industrial Estate, Hatton, Derbyshire DE65 5DU
Tel 01283 810091, Fax 01283 520412
E-mail particles@btconnect.com

USEFUL WEB LINKS

Royal Society of Chemistry
http://www.rsc.org/

Particle Characterisation Interest Group
http://www.rsc.org/Membership/Networking/InterestGroups/ParticleCharacterisation/index.asp

PCIG International Conference, PSA 2008
The Holiday Inn, Stratford upon Avon, 2 – 4 September 2008
http://www.psa2008.co.uk/

CHEMSOC, the Royal Society of Chemistry's Chemical Science Network
http://www.chemsoc.org/events/conhome.htm

ISO, International Organisation for Standardisation
http://www.iso.ch/iso/en/aboutiso/introduction/index.html

Institute of Particle Science & Engineering, University of Leeds
http://www.leeds.ac.uk/speme/ipse/events-frame.html

EventsWeb
http://www.particletechnology.org/eventsweb.php

PCIG COMMITTEE 2006/2007

This newsletter is published by the Particle Characterisation Interest Group of the Analytical Division of the Royal Society of Chemistry and edited by

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Comments on this newsletter or suggestions for inclusion should be sent to the editor.

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PARTICLE CHARACTERISATION INTEREST GROUP

PowdermatriX

PowdermatriX and the Particle Characterisation Interest Group are pleased to announce a co-badged seminar

Additives for Powder Processing

At Pride Park Stadium, Derby DE24 8XL

01332 202202

Wednesday 13th June 2007

Although often introduced at modest wt% levels, additives such as binders and lubricants can have a profound impact on process yields, production efficiency and end product properties.

This seminar will deliver an insight into the different additives available and the impact they can have on the properties of both intermediate and final products fabricated from powders.

In some industries powders are processed via a suspension (aqueous or solvent based). As a result additives are typically added at the suspension stage. Indeed, additives may be added to control the suspension rheology as well as deliver critical properties like strength further down the processing line. Other industries are dealing exclusively with dry powders, resulting in a greater potential for inhomogeneous mixing of additives and bulk powders. One objective of the meeting will be to compare and contrast the experiences and challenges faced by these two broad sub-sectors.

There will be a strong theme of industrial practise and experience running through the day. Initial presentations by additive suppliers will outline the different additive families available for powders and the range of industries using them. Subsequent presentations (covering 3 or 4 different industries) will feature case studies that illustrate the economic and technical importance of selecting the correct additive.

The final presentation will outline a European framework VI project led by CERAM Research Ltd that aims to create a database to guide SME producers in additive selection / appraisal. Focussing on the ceramics sector, the proposed database could act as a template that other industries could adapt for their own needs.

Further information can be obtained from:

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