Altana acquires Eckart

Altana Chemie AG has announced the completion of its acquisition of Eckart group with effect from 1 October, following approval from antitrust authorities. All sites and employees of Eckart GmbH & Co. KG will be retained, as will the Eckart name and corporate identity; the company will become Altana Chemie's fourth division: Effect Pigments. The acquisition involved a gross purchase price of €630 m (on a cash and debt free basis). The new division will be managed by Dr Christoph Schlünken.

Eckart is a leading manufacturer of metallic effect pigments for applications in paints and printing inks, plastics and cosmetics, as well as other technical applications. In 2004, the group achieved a sales volume of €302 m and employed about 1850 people worldwide. ECKA Granulate GmbH & Co. KG, the powder business which split from the pigment operation in 2001, is unaffected by these changes.

Further information at www.altana.com.

Sandvik Osprey developments

It has been announced that Dr Gwyn Brooks, currently Managing Director at Sandvik Osprey Ltd and co-founder of the original Osprey Metals Ltd, will retire at the end of August 2006. Richard Park has been appointed as his replacement with effect from January 2006. Mr Park has for the past 17 years worked in the Netherlands for several large enterprises including General Electric and Hunter Douglas. From 1 January until his retirement Dr Brooks will assume the position of Senior Advisor to Mats Gunnarsson, Osprey Company Chairman and Manager – Strategic Business Development at Sandvik Materials Technology (SMT).

Dr Bob Howells, the Director who has led Osprey's powder activities for the past 18 months, will also be retiring at the end of November 2005. He will, however, maintain his link with the company for a further 12 months as a consultant to the incoming Managing Director and Sandvik Osprey Board.

Sandvik Osprey has also announced measures to effect a doubling of production capacity of fine powder for MIM and other applications at its Neath facility.

According to Bob Howells, until recently step-by-step improvements to the atomising plants and downstream processing have been sufficient to meet increasing demand. However, with sales this year up over 50% compared with the same period in 2004, it has become necessary to install an additional gas atomising plant. Including the purchase of additional land, uprating of the high voltage electrical supply and expansion of all site services and infrastructure, the new powder plant takes investment by Sandvik Osprey to over £1m over the past 18 months.

Although the primary purpose of the new plant is to add production capacity, it will include features that should enable further reduction in the particle size of the powders produced. Commissioning of the new plant is scheduled for January 2006 and will increase Osprey's fine powder production capacity to over 1000 t/year.

In addition to powder production, the company remains involved in the spray-forming technology it was founded to develop in 1974. In 2003, an agreement was reached with ALD Vacuum Technologies GmbH, Hanau, under which ALD is licensed to design, manufacture and sell plant incorporating the Osprey spray forming technology.

Osprey continues to use spray forming for the in-house manufacture of a range of lightweight controlled-expansion alloys based on silicon and aluminium for electronic packaging applications. The alloys are machineable and offer clear advantages where weight is at a premium. These novel materials have already found several commercial applications and are currently undergoing qualification for large volume packages in telecommunications and aerospace.

Further information at www.smt.sandvik.com/osprey.

Boart longyear acquisition complete

The sale of Boart Longyear to global private equity firm Advent International has been completed following regulatory approvals granted at the end of July. Boart Longyear, which comprises over 40 operating companies employing over 6700 people, based in 38 countries, was formerly owned by Anglo American plc. Its business is based around the provision of drilling equipment and services, including hardmetal drillbits.

With an enterprise value set at $545m, Advent plans to continue the strategic reorganisation of management structures and operational platforms that was under way at Boart Longyear when negotiations began. A major aim will be to integrate the activities of individual businesses to eliminate duplication in manufacturing and other areas, creating 'global centres of excellence'. The business has been divided into two sectors: Drilling Services; and Products and Equipment, which encompasses the spectrum of manufacturing operations.

Advent plans a three-track growth strategy based on strategic acquisitions; increasing market penetration in under-represented territories; and diversification into non-mining drilling services where there are strong synergies with core areas of expertise. Boart Longyear has recently successfully transferred its mining expertise into allied industries that serve the construction, energy, water and environmental markets.

Further information at www.boartlongyear.com.

Avure Technologies sold

Avure Technologies Inc., which specialises in the manufacture of high-pressure industrial presses, has been acquired by Flow International Corp. by private investment firm Gores Group. Under the brand name Quintus Industrial Presses, Avure Technologies, based in Kent, WA, has been providing industrial presses for more than 30 years. Avure Technologies and Flow will maintain a commercial relationship to further development of its technology.

As part of the agreement, finalised on 2 November, Gores also acquired Flow's 51% interest in Flow Autoclave Systems (www.flowae.com), a manufacturer of hot and cold isostatic presses – a joint venture with Snap-Tec Avure Technologies AB; Flow International FPS AB; assets of Flow Holding Sagl; and FLOWES General Press operations.
Inco to acquire Falconbridge

Inco Ltd and Falconbridge Ltd announced on 11 October that their respective Boards of Directors had approved the acquisition of all the outstanding common shares of Falconbridge by Inco by way of a friendly takeover bid. The combined organisation, which will be known as Inco Ltd, will be one of the world’s premier mining and metals companies in both nickel and copper. Under the terms of this offer, the maximum amount of cash to be paid by Inco will be approximately Cdn $2.87bn. Further information at www.inco.com.

GKN reports reduced sales

In its interim financial report to 30 June 2005, GKN plc reports reduced sales of £300m for its powder metallurgy division, compared with £311m in the first half of 2004; £4m of this drop is said to result from currency variations. The reduction is attributed entirely to reduced demand in the North American automotive market. In contrast, sales were reported to be 5% higher in Europe and 16% higher in Asia Pacific and South America relative to the same period in 2004. Trading profit, which was strongly affected by rising materials costs, fell from £12m in H1 2004 to £9m. Further information at www.gkn.com.

PowdermatriX SPARK awards

SPARK awards are given to fund problem solving, proof-of-concept, technology demonstration and other development activities for companies that are members of PowdermatriX, the Faraday Partnership based at CERAM, Stoke-on-Trent, UK, which is responsible for promoting advanced ceramics and powder technology. Three recently completed programmes have brought significant benefits to the companies concerned.

- Results of a research project undertaken by Applied Functional Materials (AFM) Ltd could lead to a commercial deal worth £0.2m. AFM, a spin-out company from the University of Birmingham formed to exploit advanced technology for the manufacture of complex ceramic devices, recently undertook feasibility studies into establishing an efficient manufacturing process for creating curved piezo-composites.
  - Piezo-composites, widely used in ultrasonic applications such as sonar, non-destructive testing and biomedical imaging, perform better than a monolithic sintered ceramic. However, the manufacturing process is slow and wasteful of material. AFM believed that a more efficient method could be developed.
  - The positive results from the feasibility studies allowed by the SPARK funding have shown that manufacture of curved piezo-composites is possible, and have generated commercial interest. The study also led to the development of a moulding technique that has potential both in areas AFM is currently supplying into (e.g. satellite communications) and in new applications.

Further information at www.afm-ltd.com.

- Filtronic Comtek, the leading manufacturer of customised radiofrequency, microwave and millimetre wave components and subsystems, has completed a SPARK project designed to assess process reproducibility. Filtronic’s main product must have a temperature coefficient of resonant frequency close to zero. Since the ceramic involved is manufactured by mixing four powders, potential exists for batch variations that can cause extended product lead times.

- The project, carried out at CERAM, used zeta potential measurements of powder suspensions to study optimum dispersion conditions. As a result, a new process route involving the separate mixing of two well dispersed materials and the subsequent addition to a suspension of the two other components was developed. Production tests have shown that the approach has the potential to improve powder processing and overall product reproducibility significantly.

Further information from David Iddles (david.iddles@filct.com).

- Outokumpu Holton, a supplier of continuous extrusion machinery, has completed a successful study on the feasibility of processing titanium by the Conform process. The investigation, carried out at the Department of Materials, Imperial College London, aimed to identify suitable particulate materials as well as examining process set-ups.

  - To use the Conform process, the grooved extrusion wheel requires coating with a layer of the material to be processed. Initial trials with pure titanium failed but a titanium-copper mix was used successfully. The investigation also established that modifications to the tooling were required to raise the temperature within the wheel grooves to create the correct conditions for extrusion.

  - As a result of these findings, the Conform tooling is being redesigned and further trials are planned using titanium and other high strength materials. The project is also being developed via a Case PhD at Imperial.

Further information on SPARK awards may be obtained from Stuart Maclachlan at CERAM (stuart.maclachlan@ceram.com) or at www.powdermatrix.org.

Knowledge Transfer Networks

The Institute of Materials, Minerals and Mining is to manage, on behalf of the UK Department of Trade and Industry (DTI), the Materials Knowledge Transfer Networks (KTNs), the largest group to be formed in the reorganisation recently announced by Science and Innovation Minister Lord Sainsbury. The £40m business support product involves the migration of 19 Faraday partnerships to the KTN model. The networks will build on the successful Faraday formula, which has been key in encouraging industry and academia to work together to bring new products and processes to the market.

The Materials KTN will include the Faraday partnerships of Advance, Packaging, PowdermatriX, Plastics and Technical Textiles, together with the Smart Materials Surfaces and Structures Network and the National Composites Network.

A national technology strategy and supporting funding programme were recommended in the Innovation Report in December 2003. DTI funding of over £30m over the next three years is supplemented by £2.2m from DEFRA and the Department of Health for relevant networks. Further information at www.dti.gov.uk/ktn.

Hybrid aluminium powders

Tesimorph EAB-80, an experimental aluminium–boron material with a particle size of 80 nm developed by QinetiQ Nanomaterials Ltd (QNL), is said to offer significant potential for applications such as pyrotechnics for air bags, rocket motors (both hybrid motors and solid propellant) and other propellants where enhanced energy and faster burn rates are required. The powder was developed under a research contract from the UK Ministry of Defence.

‘This is the first time an aluminium boron hybrid particle has been produced at the nanoscale and it’s many times smaller than anything currently available’, stated Dr Paul Reip, Managing Director of QNL. ‘Conventional process methods for aluminium powders tend to produce relatively large, micrometre size particles. Our experimental work not only produces commercial quantities of nanosize aluminium particles, opening up a wide range of potential applications, it can also result in hybrid materials and alloys that cannot otherwise be produced.’
QNL develops bespoke metal, oxide, carbide and nitride nanopowders in the 20–100 nm particle size range for specific customer applications using its patented Tesima process. The process is continuous, allowing extended operation, and is scaleable so that quantities from kilograms to tonnes are possible. Powders are manufactured dry but can also be incorporated into other media, such as liquids or polymers.

This latest development is part of QNL’s ongoing work on complex and modified nanomaterials under the Tesimorph brand. Tesimorph ES-25 stainless steel, first manufactured earlier this year, was QinetiQ’s first move into this area and others in the family should include shape memory alloys. Further information at www.qinetiq.com.

Direct laser sintering advances

EOS, the laser sintering and rapid prototyping company with headquarters near Munich, is introducing new materials to open up additional application areas, particularly in the medical and aerospace areas. Cobalt–chromium alloys, Inconels and cp titanium have already been successfully tested on the company’s EOSINT M270 DMLS (direct metal laser sintering) machine. Ti–6Al–4V and other alloys widely used for orthopaedic implants are also being developed for laser sintering. A recent project includes use of DMLS components in a glass squeeze forging process, in which the mould is subjected to temperatures up to 1300°C. More than 40 parts have been produced from one such laser sintered mould.

Developments are also being made in laser sintering of a polyamide flame retardant material that meets product requirements for aerospace applications, and in product and process control technology allowing more rapid production of prototype parts.

Further information at www.eos.info.

Keronite North American venture

Keronite Ltd, the UK based surface treatment company, is expanding its presence in the North American automotive market. Keronite’s plasma electrolytic oxidation (PEO) process allows increased use of aluminium and magnesium by improving wear and corrosion resistance, thereby saving fuel and decreasing emissions.

With recent new contracts and discussions ongoing with major OEMs and suppliers, Keronite predicts increased sales by as much as 300% in 2005 over 2004. The company’s existing automotive business is in Europe, including a contract with Federal Mogul to treat cast aluminium pistons and a contract to pretreat magnesium body panels for BMW.

Keronite has, in 2005, opened a North American office in Indianapolis through a partnership with KECO Engineered Coatings, developed a presence in Southfield, MI and formed a partnership with Thixomat, a specialist in the injection moulding of magnesium alloys.

Keronite recently completed a cooperative agreement with German company Gramm Oberflächenotechnik GmbH, which allows the PEO process to be refined to target specific areas. These benefits are said to make Keronite ideal for exterior automotive

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parts such as roof rails, door handles, door frames and body panels; interior parts such as seat frames, instrument panel beams and supports, airbag retainers and mirror brackets; and engine components including piston crown and ring grooves and clutch rings.

Further information at www.keronite.com.

Leeds University and Malvern launch IntelliSense
Malvern Instruments and the Institute of Particle Science and Engineering (IPSE) at Leeds University, UK have formed a long-term partnership to launch IntelliSense. The initiative aims to further the basic science of particulate processing, stimulate, develop and nurture expertise and innovation through exchanging knowledge, and provide industrial relevance by targeting real commercial and industrial issues.

The programme will encourage industrial input through seminars on key particulate measurement and control problems, and will seek to develop innovative solutions through collaborative projects. Using a combination of sensor development, measurement, multiscale modelling and information technology, and a wide variety of research links, IntelliSense will aid in the development of the next generation of sensors and control solutions. This is especially relevant to the emerging opportunities associated with process analytical technology.

Particulate processing is a key operation in many areas other than PM, including the manufacture of pharmaceutical, agrochemical, dye and pigment, food, detergent, personal and speciality chemical products. It represents a huge business worldwide with a predicted growth factor of 5–10 over the next decade.

As part of IntelliSense, Dr Xue Zhong Wang, an existing member of the Leeds IPSE faculty, has been appointed to the new post of Malvern Reader in Intelligent Measurement and Control. Dr Wang’s recent research has focused on the investigation of techniques to help improve process performance through the integration of on-line measurement, control and information systems. Together with Technology Partnership Manager, Dr Richard Tweedie of Malvern Instruments, he will co-ordinate the activities of the IntelliSense project. A team of PhD and post-doctoral researchers will be added in the coming months, and external advisors will provide international input.

Further information at www.leeds.ac.uk/speme/ipse/.

Aeration control for rheometer
A new aeration control unit for Freeman Technology’s FT4 powder rheometer allows fine control of air flow through a powder sample, enabling automated measurement of the powder’s flow properties as a function of increasing levels of aeration. At maximum aeration – or for some powders, fluidisation – the energy required to make a powder flow is reduced by a factor known as the aeration ratio (AR). This varies from ~5 for cohesive powders to >1000 for fluidisable powders.

The bulk properties of powders can be greatly affected by even small amounts of entrained air. The aeration control unit allows evaluation at air velocities down to 2 mm min\(^{-1}\), whereas aeration at higher velocities up to 2 m min\(^{-1}\) can examine the fluidisation behaviour that has important processing implications in industries such as toner production, powder coatings and pharmaceutical manufacturing.

AR measurement on the FT4 can be fully automated. The elimination of user variability allows confident discrimination of even small differences between powders, with data reproducibility typically better than 1%.

Further information at www.freemantech.co.uk.

Nanomaterials manufacture report
‘NANOMAT: nanomaterials manufacture and applications – a mission to Finland, Germany and Switzerland’ is the report of a Global Watch Mission supported by the UK Department of Trade and Industry.

The mission, run in April 2005, consisted of experts from the DTI, Indestructible Paint Ltd, Loughborough University, MEL Chemicals, NPL, Pilkington plc, Powdermet®X, Tetronics Ltd and Visteon Ltd. The group visited nine organisations in Finland, Germany and Switzerland involved in nanopowders and nanomaterial development.

The report is a mine of information on the current status of nanomaterials manufacturing and applications. It covers a wide range of applications, processes and materials: coatings, glass coloration, photovoltaic solar cells, self-cleaning surfaces, polymers, soi–gel and hybrid materials, catalysts, biomedical, etc.

There is a useful discussion of commercial issues, with case studies and also a discussion of networks and clusters in the different countries. Lastly the appendices outline the host organisation and the activities of the UK organisations.

This 80 page report is available from Charlotte Leiper of the DTI Global Watch Service at: Pera Innovation, Pera Innovation Park, Melton Mowbray, Leics. LE13 0QP, UK, tel. +44 (0) 1664 501551, fax +44 (0) 1664 501261.

John Dunkley

Metal powders survey
The fourth edition of Joseph M. Capus’s compendium on metals powders and their markets is now available. ‘Metal powders: a global survey of production, applications and markets to 2010’ provides an expert assessment of the factors expected to influence the industry to 2010, including forecasts of consumption by geographical region and type/composition of powder. Also included is an analysis of end user industries, a technical overview of metal powder production and a review of powder producers worldwide. Available in print or electronic (PDF) format, the report is priced at £1250/$1875/€1875.

Further information from: Lisa-Marie Nelson, Elsevier Advanced Technology, PO Box 150, Kidlington OX5 1AS, UK, fax +44 (0) 1865 843971, email l.nelson@elsevier.com, Internet www.metal-powder.net.
WinteRev 2006

The third in the focused WinteRev series of meetings organised by the European Hard Materials Group of EPMA will focus on ‘Structure–property relations and near-surface characterisation’ of hard materials. It will take at Fraunhofer IWS, Dresden, Germany on 23–24 February.

New hardmetals based on carbides and carbonitrides with transition metal binders are being evaluated on a continuous basis, particularly to examine new kinds of powders, powder mixes and compositions. Thermally spayed coatings (TSCs) are increasing in their market penetration, both in volume and in types. Often TSCs are based on hardmetal systems, although there are significant differences in their microstructures. A primary purpose of the meeting is to bring together research groups with an interest in structure–property relationships in these two contingent themes and debate the similarities and differences appropriate to these systems.

New materials need to be benchmarked against conventional materials for basic properties such as hardness, wear resistance and toughness. This task is lengthy and frequently difficult because of the lack of good data from validated measurement methods by which to make the comparisons. Also, there has been considerable research using the concepts of microstructural design to produce alternatives to the conventional two-phase structures. In addition, hard materials are frequently designed to give enhanced properties in near-surface regions with structures that differ from the internal matrix. There are, therefore, important questions regarding the utility of the structure–property relations developed for bulk materials when applied to the characterisation of these extremely fine structures close to the surface.

Microstructures need to be quantified and there are no standardised techniques specifically for hardmetal multiphase structures, although ISO is currently developing a potential standard for WC grain size in contribution to this requirement. Mechanical properties can be usefully assessed by methods such as hardness and toughness for bulk properties, but there is insufficient knowledge to mechanically interrogate near-surface regions with the same confidence. Magnetic coercivity provides a characterisation tool for indirectly checking the WC grain size and magnetic saturation measurements can be used to investigate differences in binder phase chemistry, but these techniques may not cope with more complex (i.e. hybrid, gradient or composite), or finer or coarser structures with perhaps alloyed binder phases. Measurements on materials with a low cobalt content have indicated that current understanding is probably suitable only for specified composition ranges.

models are needed for materials outside these limits, and these should be underpinned by further work investigating the nature of the cobalt distribution.

For further information contact: Dr Lutz-Michael Berger; Fraunhofer IWS, Winterbergstrasse 28, D–01277 Dresden, Germany, email lutz-michael.berger@iws.fraunhofer.de; or Dr Bryan Roebuck, Materials Centre, National Physical Laboratory, Teddington TW11 0LW, UK, email bryan.roebuck@npl.co.uk.

Short course in surface engineering

The School of Engineering at the University of Surrey is running a short course on Surface Engineering at the University in Guildford from 30 January to 3 February 2006. The course aims to cover PVD, CVD, thermal spraying, nitriding, carburising, ion implantation, metallic coatings, paints, polymeric coatings and characterisation techniques.

It is one of a range of 20 courses that can be taken alone or linked to form a modular MSc degree programme.

Further information from: Rebecca Jones, Postgraduate Administrator, School of Engineering, Post Bag D3, University of Surrey, Guildford GU2 7XH, UK, tel. +44 (0) 1483 689378, fax +44 (0) 1483 686671, email rf.jones@surrey.ac.uk, Internet www.surrey.ac.uk/eng.