

## CONFERENCE REPORTS

*International Symposium on Magnetic, Electrical and Gravity Separation (MEGS01)*. Falmouth, Cornwall, UK, June 19–21, 2001

This three-day conference was organised by Minerals Engineering International in collaboration with De Beers. It was an effort to revive previous successful conferences on magnetic separation held in 1976 in New Hampshire (USA) and in 1981 in Salford (UK). These highly successful conferences were held during the heydays of high-gradient magnetic separation and the advent of new powerful permanent magnet materials. These were exciting times, during which the physicists combined their forces with technologists in an effort to offer new solutions to seemingly insurmountable problems in minerals treatment. These were also times when expectations were high and promises were made that were later found to be difficult to meet. In ensuing years magnetic separation grew into a technique based on modern technology and joined with electrical and gravity separation, as an efficient physical method of material treatment. It was thus only natural to bring together these often overlapping physical techniques, and this is how the idea of MEGS01 was spawned.

The MEGS01 conference brought together approximately 80 delegates from 26 countries worldwide. Several industrial suppliers prepared interesting exhibits. Twenty-nine oral presentation and nine posters were selected by the organisers for presentation from seventy abstracts submitted. A wide spectrum of topics covered theoretical and practical aspects of magnetic, electrical and gravity separation was covered. This can be illustrated by a random selection of presentations:

The effect of vibration on the purification of limestone by dry HGMS was discussed by A.C. Johansson (Lulea University,

Sweden). S. Ersaying (University of Minnesota, USA) described the performance evaluation for magnetic taconite plants. Magnetic classification in magnetic separation was the subject of a presentation by P.A. Augusto (University of Porto, Portugal) while J.H.P. Watson (University of Southampton) discussed the separation of micron-sized ferromagnetic particles. The application of a "ferrous wheel" to magnetic concentration of iron ore in Brazil was the subject of a presentation by S.C. Amarante (MBR, Brazil) and Xiong Da-He (Ganzhou Institute, China) elaborated on further application of SLON magnetic separation in China.

Electrical separation of plastics from special wastes was discussed by V. Gente (University of Rome, Italy) while G. Dodbida (University of Akita, Japan) described electrostatic separation of shredded plastic flakes using a cyclone tribo-charger. The idea of the dry separation of fine particles using the "Magnus force" was presented by P.C. Rem (Delft University, The Netherlands) and separation at densities higher than  $4.0 \text{ g/cm}^3$  using a Larcodems vessel was reported by P.J. Grobler (Isacor, South Africa).

A poster on the recovery of fine particles of precious metals by magnetic flocculation was prepared by V.V. Karmazin (Moscow State Mining University, Russia) while T. Fujita (Akita University, Japan) submitted a poster on the recovery and LCA of nickel particles from waste capacitors by OGMS.

Most contributions, after being peer-reviewed have been published either in the *Minerals Engineering* journal or in the journal of *Magnetic and Electrical Separation*.

The overall impression was that the conference had been well organized, and to presented a rare opportunity for specialists in physical techniques of material treatments to exchange their new ideas. At most general mineral processing conferences and congresses, such contributions are either oppressed Cinderellas swamped by the sea of papers on comminution and flotation, or are not accepted at all. The next MEGS conference is provisionally scheduled to be held in Perth, Australia, in March 2004.

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*The Fourth International Conference on Materials Engineering for Resources (ICMR2001), Akita, Japan, October 11–13, 2001*

The philosophy of ICMR conferences is to integrate various ideas from a wide spectrum of scientific and engineering fields into new concepts that hold promise for application in the 21st century. The fourth of these conferences was held again in Akita, industrial, economic and cultural center of northern Honshu. The conference programme was divided into six topics: New recycling systems, Processing and characterisation of functional materials, Construction materials for sustainable development, Concrete – an environmentally conscious material, Co-operative policies for relevant environment and resource systems in the Far east and Computer engineering and materials engineering for resources.

Eight plenary lectures were presented at the conference, on subjects such as electro-deoxidation, recovery and utilisation of reactive metals by molten salt electrochemistry, sintering, and processing of ultrafine particles. Approximately twenty invited special lectures, presented by overseas and Japanese delegates covered fields such as Clean technology in the metallurgical industry (F. Habashi, Laval University, Canada), Metal recycling industry in Canada (W.T. Yen, Queens University, Canada), Recycling of aluminum alloys (V. Zolotarevskiy, Moscow, Russia), Recycling of incineration residue of municipal waste and fly ash (J. Hojo, Kyushu University, Japan).

The author of this report presented a paper entitled “Magnetic methods of material treatment: technology at crossroads”. The current status of magnetic separation was reviewed. The advantages of this technology in comparison to other physical methods of material manipulation were discussed and reasons for its failure to live up to its potential and expectations were indicated. The future focus in such diverse areas as mineral processing, waste treatment and recycling and biosciences were discussed and the research and development needs were outlined.

Professor Young Sam Kim (Dong-A University, Korea) described the production of magnetite, Fe and Fe-Co-based magnetic fluids with ethylene glycol as the carrying fluid, from waster pickling liquor. Comparison of the physical properties of these ferrofluids showed that while the conventional magnetite-based ferrofluid attained

the magnetisation of 14 emu/g (265 G) at a density of 1.5 g/cm<sup>3</sup>, the magnetic fluid containing 70% of Fe-Co reached a magnetisation as high as 73 emu/g (approximately 4500 G).

Approximately seventy five contributions, mainly by the Japanese researchers, were presented in short 3-minute lectures followed by a poster exhibition. These presentations showed a large diversity of research programmes in materials engineering in Japan. High levels of innovation and an unorthodox approach to problem solving were typical features of many of these contributions.

A new method for the determination of the critical deposit velocity of settling slurry flow in pipes was presented by a team headed by Professor H. Sato (Akita University, Japan). The measurement of the velocity of solid particles on the bottom of a pipe using image analysis was used to correlate this velocity with the mean slurry velocity. This correlation then allows the determination of the critical deposit velocity.

Professor Fujita (Akita University) and his collaborators presented a paper on the liberation of materials by electrical disintegration. It was shown that electrical disintegration is a promising and efficient technique for the selective liberation of a variety of materials. Dr. K. Murata (NOF Corp., Japan) discussed the extraction of precious metals from scrap mobile telephones by explosion in water. Extraction of gold, palladium and copper was found to be greater than 90%.

The conference was very well organised and presented an opportunity to advance the cause of modern technology. It was also a success from the perspective of meeting and making new contacts in a wide spectrum of technologies. Proverbial Japanese hospitality and delicious dishes rounded off this successful event. Plenary and special lectures are published in Volume 1 of the Conference Proceedings while the poster presentations are contained in Volume 2.

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