

—Conference Reports—

5TH SOUTHERN HEMISPHERE MEETING ON MINERAL TECHNOLOGY

**Buenos Aires, Argentina
May 6th to 9th, 1997**

The 5th Southern Hemisphere Meeting on Mineral Technology is the fifth in the sequence: 1. Rio de Janeiro, Brazil, 1982, 2. Rio de Janeiro, Brazil 1987, 3. Sao Lorenzo, Brazil 1992, 4. Concepcion, Chile 1994 and 5. Buenos Aires, Argentina 1997. The sixth meeting will be held in 1999 in Rio de Janeiro.

Argentina is a country with a limited history of mining and metallurgy. Since 1992, the country is, however, entering a period of boom. Gold, lithium and copper are the main new projects.

The conference was sponsored by Minera del Altiplano SA, Minera Alumbrera Ltd., Tamrock Argentina SA, Minera TEA SAMICAF, Lovob & Cia., Merck Argentina SAIC and Jenck SA. The conference was held at the Costa Salquero Centre in Buenos Aires from May 6 to May 9, 1997. There were approximately 100 delegates attending the conference from Argentina, Chile, Brazil, Italy, Canada, USA, Australia, China, Turkey, India, Spain, Czech Republic, Russia and Poland. The majority of delegates were from universities and institutes for mineral technology. The official languages were Spanish and English, with simultaneous translation.

Ninety papers were presented in two parallel sessions. The emphasis was again on froth flotation but papers on waste treatment and recycling were also amply represented. Presentations on mineral technology covered the following broad areas: Comminution and classification (5 papers), Material analysis and characterisation (12 papers, 3 papers covered some aspects of magnetic separation), Electrostatic, magnetic and gravitational separation (5 papers, 1 on magnetic separation), Mineral flotation (22 papers, 3 papers included magnetic techniques), Hydrometallurgy (12 papers), Pyrometallurgy (6 papers), Biohydrometallurgy (3 papers), Waste treatment and recycling (15 papers), Simulation modelling and control (7 papers) and Other physical-chemical processes (3 papers).

Papers on magnetic separation were the following:

B. Ipekoglu and I. Kusun: *Concentration of potassium feldspar from granite and syenite rock.*

M.J. Salum and A. Costa: *The influence of the use of Magstream on floatability of quartz.*

P.F. Braga and J.A. Sampaio: *Beneficiation of fine feldspar from stone quarry.*

A.B. Luz and P.L. Florido: *Magnetic separation of kaolin.*

The conference coincided with an important exhibition of equipment, machinery, products, raw materials and services in the mining and mineral processing technologies. The Meeting Proceedings including the full English versions of 90 papers is available at INTEMIN, P.O. Box 327, 1650 San Martin, Buenos Aires, Argentina, tel.& fax: 54-1-754-4070.

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**COMPLEX ORES '97 SYMPOSIUM
INTERNATIONAL SYMPOSIUM ON THE PROCESSING OF COMPLEX
AND REFRACTORY ORES**

**Bulawayo, Zimbabwe
March 19th to 21st, 1997**

This three-day meeting gave academics and industrialists the opportunity to discuss the latest developments in the physical, chemical and biological processing of complex and refractory ores. This was the second symposium of this nature organised by CSM Associates Ltd., in collaboration with Camborne School of Mines and *Minerals Engineering*. This year it was also held in collaboration with Zimbabwe's National University of Science and Technology. The first symposium on this subject was held at the Camborne School of Mines in Cornwall, England in April 1993.

About 55 participants from 10 countries attended the conference held at the Bulawayo Sun Hotel, in the heart of Matebeleland, Zimbabwe. The symposium and a small associated exhibition were well organised. The majority of the delegates came from Southern Africa, with some from England, Australia, Canada, Brazil and Finland to name a few. Twenty delegates were from tertiary institutions and the rest from industry, which is very good for a symposium of this nature. Twenty three papers were presented at the symposium. Overall, the papers were of high standard and if accepted after being refereed, will be published in a special volume of the *Minerals Engineering*, later in 1997.

Prof. T.J. Veasey, head of the Department of Chemical Engineering at the University of Science and Technology in Bulawayo (previously from the University of Birmingham) delivered the keynote address on the review of the minerals industry in Zimbabwe. He referred to major advances in the minerals industry in Zimbabwe and touched on some exciting future developments.

During the sessions of the first day, various papers on the processing of refractory gold ores were presented which included papers on the gold recovery from arsenopyrite, refractory pyrite and refractory wood chips. There were also a few papers on alternative lixiviants as well as bioleaching. An interesting paper was presented by Loftus et al. on the development and design of jet reactors for the extraction of valuable minerals from refractory ores. This exciting new technology is similar to that used in jet cutting industry using water jets.

The whole of day two was used for a wide variety of topics which included biotechnology, hydrometallurgy, comminution, classification and dewatering. On the last day, papers on the extraction of base metals from refractory base metal ores were presented. This included work on the Century zinc deposit in Queensland, Australia, the application of the Activox process in the treatment of low-grade nickel-cobalt ores, selective flotation of copper and zinc from complex ores and the recovery of ferrochrome from slag at Zimasco in Zimbabwe, just to mention a few.

In general, it was a very useful symposium and further information about the proceedings can be obtained from Dr. B. Wills, CSM Associates, Trevenson Site, Redruth, Cornwall, England.

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MINERALS ENGINEERING '97

Santiago, Chile
July 30 – August 1, 1997

The latest in the series of *Minerals Engineering* conferences, held in Santiago, Chile, promised to be a useful opportunity to meet specialists from South America who do not often travel to more traditional conference venues. Regrettably, this promise was not fulfilled: the conference was poorly attended and lacked diversity and direction. Fewer than 70 delegates and a single sponsor participated in the event, only marginally more than in the 1991 Singapore conference held during the Gulf War. Only a handful of delegates from South America attended and conspicuous was the absence of delegates from the active Chilean mining industry.

Of considerable interest was the keynote address on the Chilean mining industry. The industry is presently characterised by rapid and extensive growth of foreign investment, increased production and export. The Government share of copper production is decreasing and the dollar entry is increasing. It is expected that the production and export trends will continue in the future. On the other hand, maximalisation of investment in Chilean human capital and stimulation of development of production sectors linked to the mining industry remain the main challenges.

An interesting paper on a novel magnetic carrier technology in metal recovery from industrial effluents was presented by J. Finch from McGill University. The technique combines magnetic separation with the functionalisation of magnetic carriers for metal ion recovery. There also seems to be a renewed interest in crushing as a primary breakage step rather than autogeneous milling. It is significant that all contribution on crushing originated from Chalmers University in Sweden. Three excellent papers on major advances in the modelling of crushers were presented. Papers on milling included one on dry air-swept milling, one on liner design and one on jet milling.

Otherwise, the programme was dominated by mostly academically orientated contributions on flotation. Numerous presentations were rather pedestrian, often drowned in excessive details, and frequently exceeded the prescribed 20 minute limit. On the other hand, several valuable contributions were relegated to the poster presentations, with a 5 minute race of oral introduction.

Lack of strategy and focus of the organisers was apparent. Unprofessional chairing of some of the sessions was disturbing, topped by occasional mispronunciation of the authors' names or their organisations by one of the organisers. The post-conference plant visits were canceled without explanation and several overseas delegates, with firm travel arrangements, remained stranded in Santiago for several days. The disappointment with the technical aspects of the conference was partly compensated for by the attractiveness of Santiago and its environs, and by the friendliness of the Chilean people.

Building a reputation is a long and fragile process. If *Minerals Engineering* conferences want to be a world-class player in today's competitive environment of quality conferences, it must be market and customer, i.e. delegate-driven. And delegates require value, consistency and professional commitment. It does not appear that CSMA Minerals Ltd. presently have a winning strategy. It is becoming increasingly difficult to justify attendance of *Minerals Engineering* conferences.

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FIRST GERMAN WORKSHOP ON FERROFLUIDS

Bremen, Germany
June 11 –13, 1997

From June 11 till June 13, 1997, the Centre of Applied Space Technology and Microgravity (ZARM) of the University of Bremen conducted a workshop on ferrofluids. The workshop was convened by S. Odenbach and, for the first time, brought together researchers in this field in Germany. Approximately 45 participants from universities, research institutes and industry represented all important aspects of the ferrofluids research.

The programme of 22 oral and 13 poster presentations was divided into six sessions: Production of magnetic fluids, Biological and medical applications, Experimental and theoretical investigations of hydrodynamics, viscous and viscoelastic properties, Applications of magnetic fluids and Separation in magnetic fluids. A selection of some topics is given below.

Buske (Berlin) reviewed production of magnetic fluids and needs for further research. Schwender (Nuertingen) presented products of Ferrofluidics Corporation and Wagener (Bremen) reported on the production of metal-based ferrofluids reaching high saturation magnetisation and low viscosities for applications in the

sealing technology. In the field of theoretical treatment of dynamics of ferrofluids, Felderhoff (Aachen), among others, described a microscopic theory of the interaction of magnetic particles in order to explain dynamics of ferrofluids. Stierstadt (Munich) gave an overview of experimental investigations into the convection in ferrofluids. He stated that there is still a large field to be investigated since this has not been done with ferrofluids for many convective effects well known in regular fluids.

Much attention was paid to investigations of viscous properties of ferrofluids. Odenbach (Bremen) discussed experimental results in the field of rheological behaviour in magnetic fields, one of which being a method to measure the influence of shear rate and magnetic field on viscosity of various ferrofluids with a rotating plate rheometer. Zeuner (Magdeburg) measured a change of viscosity in Hagen-Poiseuille flow under the influence of an oscillating magnetic field in the flow direction.

In the session on material separation, Madai (Freiberg) reported on various investigations into magnetohydrostatic separation of metal scrap in ferrofluids. Guenther (Berlin) presented a poster on separation of capacitors into fractions containing PCB and free of PCB, respectively. A test run of the plant for this separation is planned to take place by the end of 1997. Using this technique, the deposition costs can be reduced drastically since only those capacitors containing PCB need a special deposition. Bruhn (Ulm) discussed separation of metal scrap from printed circuit boards in ferrofluids. The value of ferrofluid removed from the process is in the range of the material value of the separated products. A reduction of the costs by the fluid recovery should be demonstrated.

In the final discussion some participants pointed out a necessity to intensify cooperation and exchange of information. It was thus concluded that the ferrofluid workshop would be established as a regular event to take place every two years. The next workshop is planned in Magdeburg in 1999. The home page of this event is: <http://comserv.urz.uni-magdeburg.de/~anp/ferro/ferro.html>. It is also planned to collect physical and chemical properties of ferrofluids, publications and other relevant information and make these available on Internet. Further information can be obtained from Dr. S. Odenbach, ZARM, Dieterichweg 21, Hochschulring/Am Fallturm, 28359 Bremen, Germany, e-mail: odenbach@zarm.uni-bremen.de.

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