



IMA president welcoming delegates at the opening ceremony. PHOTO TIM IVANIC



www.ima-mineralogy.org

International Mineralogical Association

FROM THE PAST PRESIDENT

The excellent 19th general meeting of IMA in Kobe is described by the organizers elsewhere in this issue of *Elements*. Everyone I spoke to agreed it was a thoroughly enjoyable event. The scientific standard of the talks was particularly high, reflecting the emphasis placed by universities and government on mineralogy and materials science in Japan. Heartfelt thanks are due to Takamitsu Yamanaka and his team for an extremely smoothly run meeting and some memorable (sometimes deafening!) social events.

Slightly smaller and more mineralogical than competing conferences, it is the emphasis on 'international' that gives IMA meetings their distinctive flavour. IMA has an important role in fostering international collaboration, particularly for the smaller mineralogical societies, and it is always a pleasure to renew old acquaintances. It is, however, disappointing that many members of the larger mineralogical societies do not automatically make IMA meetings their first choice of 'big' meeting. They should. I contend that the international character of science – the set of common rules and practices that all scientists share – is of enormous potential benefit to mankind, well worth the effort of some extra travel or the need to concentrate a little harder on slightly less-than-perfect English.

IMA meetings are complex for the officials of IMA. As president, I had to chair two meetings of the IMA Council and two business meetings (at which supporting organizations are represented, in proportion to their size, by between one and five national representatives), before handing the reins over to Takamitsu Yamanaka, my successor as president, for a final council meeting. All this activity

has to be orchestrated, and papers provided, by our very hard-working Secretary, Maryse Ohnenstetter. Thanks from all of us, Maryse. In addition, the various commissions and working groups of IMA each hold at least one meeting – thanks too to their chairs and secretaries.

Practical Matters

From this behind-the-scenes activity emerged both formal changes and exciting initiatives for IMA. The Council for 2006–2010, was approved, with some new members (see photo page 318). Missing from the picture is a new communications officer, yet to be appointed, who, together with the president, secretary and treasurer, will be a member of the Executive Committee. New officials were appointed to commissions and working groups. Dogan Paktunc, Katsuo Tsukamoto and Sergey Smirnov become chairmen of the Commission on Applied Mineralogy, the Commission on Mineral Growth and Interface Processes and the Working Group on Inclusions in Minerals, respectively. A full list of officials can be found at www.ima-mineralogy.org.

The Commission on New Minerals and Mineral Names (CNMNM) has been merged with the Commission on the Classification of Minerals (CCM) to form the new Commission on New Minerals, Nomenclature and Classification (CNMNC). These commissions represent the most widely known activities of IMA. The merger will solve problems encountered in the past at the boundaries of the fields of activity of the former commissions. The CNMNC will operate under the leadership of the hard-working Ernst Burke, who described the activities of CNMNM in *Elements* 1 (3).

Although far in the future, IMA needs to find a venue for the 2014 general meeting. In view of the locations of recent meetings and the 2010 meeting in Budapest, it would be appropriate to meet in North America, and we hope that proposals will come forward. Business meetings take place every two years, and it was decided to hold business and council meetings at the time of the 2008 Goldschmidt Conference in Vancouver, Canada. Council will meet during the combined societies 'Frontiers in Mineralogy' meeting in Cambridge, England, in 2007.

We hope that the problems of collecting membership dues [*Elements* 2 (1)] have been solved. The formula for calculating subscriptions leads to per capita payments that are smallest for the largest societies. Rather than increasing contributions paid by the larger societies, the subscriptions of our fifteen smallest societies, each with less than 25 members, will be reduced from 60 to 30 US\$. The decrease in income will be compensated by an improvement in our annual investment income. The problem of the costs of international bank transfers has been solved by Bob Downs' discovery of a bank that will not charge for accepting cheques in foreign currencies. We can further help societies by

accepting payment up to four years in advance at business meetings.

Strategic Initiatives

Several initiatives will be developed in the months to come:

- An annual IMA Medal for Excellence has been founded. A Medals Committee will be formed, chaired by Joel Grice. Candidates can be nominated by national societies and by individuals.
- IMA will become the home of the comprehensive Internet mineral database, being built by the RRUFF project, which is led by Bob Downs and George Rossman, with support from Michael Scott, the first president of Apple Computers, who himself is a keen mineral collector. The database will contain X-ray diffraction data, Raman and infrared spectra and microprobe data and analyses. It has spectacular opportunities to be linked to new, miniaturized spectrometers for mineral identification in the field.
- Many councillors feel that some of the commissions and working groups are not fulfilling their role adequately. Suggestions include forming a nucleus of experts in each field to lead developments, making more use of the Internet, and ensuring that chairmen serve no more than four years.
- The presidency of IMA will, in the future, be decoupled from chairmanship of the general meeting, a connection that has developed through custom rather than statute. A democratic system and a shorter term of office for the president would ensure that an increasing number of leaders in the field of mineralogy would become aware of the workings of IMA and contribute fresh ideas.

I will end by wishing my successor, Takamitsu Yamanaka, every success in the next four years.

Ian Parsons
President of IMA, 2002–2006

IMA 2006, KOBE, JAPAN

The 19th general meeting of the International Mineralogical Association took place on July 23–28, 2006. The National Committee for Mineralogy of the Science Council of Japan (SCJ) has supported IMA since it was established in 1958. At a business meeting during IMA 2002 in Edinburgh, a proposal from the National Committee of SCJ for a meeting in Kobe was accepted. The meeting was run jointly by the Science Council of Japan, the Mineralogical Society of Japan, the Association of Mineralogists, Petrologists and Economic Geologists, and the Society of Resource Geology. The organizing committee would like to express hearty thanks to all participants for their cooperation and contribution to this conference. A total of 975 participants registered (including accompanying persons), from 50 countries. A total of 874 papers (488 oral presentations, 386 poster presentations) were contributed during the six days. Six hundred delegates attended the receptions and banquets, maintaining old friendships and making new ones, and discussing recent and future progress in science.

Mineral science has expanded widely, not only in geosciences but also in planetary science, bioscience, and materials sciences. Mineral scientists contribute strongly in interdisciplinary fields. Consequently we decided that the catch phrase of the conference would be “Expansion to Nano, Bio and Planetary Worlds.” After considering many significant suggestions and comments from our international program committee and from IMA commissions and working groups, the local program committee prepared a timetable of 37 sessions. We express our gratitude to the Science Council of Japan for their cooperation and large financial contribution. We also extend our appreciation to Kobe City and to many companies for their financial donations or support. Many thanks are due to Dr. K. Korokawa, president of SCJ, and to Mr. T. Yada, mayor of Kobe, for their welcoming speeches during the opening ceremony. We greatly appreciated the message from Mr. S. Koizumi, prime minister of Japan.

Kobe City is one of the most beautiful port cities in Japan. Unfortunately, eleven years ago, an enormous tragedy struck Kobe. More than 6000 lives were lost during a big earthquake. But the city was completely rebuilt. I personally believe many of the participants enjoyed the night view of Kobe, and I hope they took pleasure in the Japanese culture during the meeting. Finally, we hope the Kobe conference will be fondly remembered by all participants.

Takamitsu Yamanaka
President of IMA 2006–2010

Impressions from the out-going President

From the standpoint of a participant, without the considerable responsibilities of actually running the meeting, Kobe 2006 was thoroughly enjoyable. Takamitsu and his team did a magnificent job, and the organization was

relaxed and faultless. The scientific programme was intense, based on 37 sessions with up to 7 oral sessions running simultaneously. The organizers had assembled a galaxy of international plenary lecturers (Catherine McCammon, Bayreuth; Christoph Heinrich, ETH Zurich; Eiji Ito, Okayama; Jillian Banfield, Berkeley; Lindsay Keller, NASA Houston; Lukas Baumgartner, Lausanne; Yoshiyuki Tatsumi, JAMSTEC Yokosuka; Michael Carpenter, Cambridge; Sumio Iijima, Meijo) whose excellent early afternoon talks were very well attended. The overall scientific standard of the oral presentations was extremely high, reflecting, I think, the quality of the science done in Japan and the resources that its government puts into our field of science.

Session topics covered all of mineralogy, with experimental and theoretical work at the very high pressures of the deep Earth well represented, as one would expect in Japan. Crystal and glass structure and properties, of both natural and synthetic materials, and modern applications of spectroscopy, synchrotron radiation and neutron science figured strongly, together with crystal growth and texture formation; the big word ‘nano-’ appeared in two contexts. Petrological sessions had a distinctly active margin emphasis: sea-floor hydrothermal systems; metal deposits in magmatic arcs; extreme P–T metamorphism; subduction factory; ocean crust and mantle. Fluid- and bio-mineral interactions, environmental mineralogy, clays and zeolites were all covered, as was the role of minerals in the emergence of life. Solar system evolution, lunar and martian rocks and several up-to-the minute accounts of interplanetary dust returned by the Stardust mission from the comet Wild-2 contributed to strong sessions on matter extraterrestrial. The very distinctively mineralogical topics of new minerals and mineral classification, and of museums, were well supported. IMA Kobe more than lived up to the reputation of these meetings as the flagship international conference of the mineralogical world.

Kobe is a dramatic place, and the one-hour drive through the extraordinary close-packed industrial landscape from Osaka airport, with steep, densely forested hills rising immediately

Organizing Committee of IMA 2006, Kobe:

- General Chairman – T. Yamanaka
- Secretary – E. Ohtani
- Science Program – K. Fujino
- Scientific Excursions – S. Matsubara
- Treasurer – T. Murakami
- Donations – H. Kaneda
- Publicity Chair – R. Miyawaki
- Local Arrangements – M. Matsui



Kobe near the conference centre



Drumming during the banquet – less inhibited delegates were invited to ‘have-a-go’. PHOTO TIM IVANIC



Dragon dancer

behind the coastal lowlands, leaves an indelible impression. As little driver-less trains shuttle faultlessly about, it is hard to believe that such a complex, high-tech urban area could have been devastated by a great earthquake so recently. Only a strangely deformed block pavement, preserved near the conference centre, provided a reminder of the displacements and mighty forces involved.

Japanese society is renowned not just for its energy and efficiency but also for its calm and devotion to good manners. All these were very visible at the meeting. But when they let go, our Japanese friends clearly like brilliant colours, violent movement, and a great deal of noise. We were treated to dragon dancers, lion dancers and ear-splitting drumming as well as more restrained, and very beautiful, Japanese traditional music. Kobe more than fulfilled the ‘international’ in IMA and it was good to see mineralogists from 50 countries so obviously enjoying themselves. I’m already looking forward to Budapest in 2010.

Ian Parsons

NEW IMA COUNCIL



The current Council of IMA. **Left to right, back row:** Anhuai Lu (China), Joel Grice (Canada), Ekkehart Tillmanns (Austria, Chairman of the 2010 General Meeting), Nicolai Yushkin (Russia), Maryse Ohnenstetter (Secretary, France), Herta Effenberger (attending on behalf of EMU). **Front row:** Walter Maresch (Germany), Ian Parsons (Great Britain and Ireland), Takamitsu Yamanaka (President, Japan), Robert Downs (Treasurer, USA), Marcello Mellini (Italy), Kari Kojonen (Finland).

MAC FOUNDATION SCHOLARSHIP TO SASHA WILSON



Every year since 1998, the Mineralogical Association of Canada awards a \$10,000 scholarship to a deserving student in one of the fields of mineralogy, crystallography, petrology, or geochemistry. This year's winner is Siobhan A. (Sasha) Wilson, from the University of British Columbia. Born in Oshawa, Ontario, in 1980, Sasha graduated from McMaster University in 2003 with an Honours Bachelor of Science in physics with a minor in Earth sciences. She began her studies at the University of British Columbia as a master's student in the fall of 2003 working under the supervision of Gregory M. Dipple and Mati Raudsepp. She completed her MSc in the fall of 2005 and began work toward her PhD immediately thereafter.

Sasha's MSc and PhD thesis research concern the disposal of atmospheric carbon dioxide in mine tailings. Mineral carbonation is a safe and permanent method of carbon disposal in which silicate minerals react with atmospheric or industrial CO₂ to produce geologically stable, environmentally benign carbonate minerals. Naturally occurring mineral carbonation phenomena have recently been observed at the surface of chrysotile mine tailings at Clinton Creek, Yukon; Cassiar, British Columbia; and Thetford Mines, Québec; as well as at the Mount Keith nickel mine, Western Australia; and the Diavik diamond mine, NWT. The primary focus of her master's research was to characterize and quantify natural mineral carbonation at the abandoned Clinton Creek and Cassiar chrysotile mines. Her PhD research involves documentation and acceleration of mineral carbonation phenomena in the active mine sites at Mouth Keith and Diavik. Sasha describes her research as follows:

The principal techniques employed in my study have been mapping and sampling, X-ray powder diffraction (XRPD), scanning electron microscopy (SEM), Raman spectroscopy, radiogenic carbon dating, stable isotope analysis, and bulk chemical analysis.

As part of my master's research, I presented the first detailed field characterization of natural mineral sequestration in ultramafic mine tailings at Clinton Creek, YT, and Cassiar, BC. I detailed the modes in which the hydrated magnesium carbonate minerals hydromagnesite, dypingite, nesquehonite, and lansfordite occur in tailings environments and defined the mechanisms by which they form.

I have successfully applied the Rietveld method for quantitative phase analysis to X-ray powder diffraction profiles for natural and synthetic serpentinite mine residues. This is the first instance in which the Rietveld method has been used successfully to compensate for structural disorder in the kaolinite-serpentinite group minerals. I have confirmed crystallographic binding of carbon and have quantified CO₂ uptake in tailings samples.

I have developed a new procedure allowing unambiguous fingerprinting of the source of carbon tapped in the formation of carbonate minerals. Using radiogenic and stable isotope techniques, it is possible to determine whether the carbon in carbonate efflorescences has been derived from the atmosphere. Using isotope data and Rietveld results, I have quantified the amount of atmospheric CO₂ bound in carbonate minerals.

Studying mineral carbonation in active mines at Mount Keith, Western Australia, and Diavik, NWT will contribute towards the design of new mining processes that will accelerate CO₂ uptake to create the world's first generation of zero-emissions mining operations. I have observed and quantified the precipitation of hydromagnesite in tailings at Mount Keith and have documented the precipitation of nesquehonite in the kimberlite tailings at Diavik. Further field work and bench-top precipitation experiments will determine whether mineral carbonation is a valid means of CO₂-sequestration under the desert conditions at Mount Keith and in the tundra at Diavik.

Global implementation of carbon sequestration in ultramafic mine tailings has the potential to draw CO₂ directly from the atmosphere at a rate of 10⁸ tonnes of carbon per year. In situ sequestration in mine tailings bypasses the need to transport large quantities of tailings to industrial point sources and can be accomplished without high-pressure, high-temperature reactors. Mine tailings may, therefore, represent the optimal environment in which to pursue carbon sequestration in minerals.



CSIRO GEOSCIENTIST AWARDED RESEARCH MEDAL

CSIRO scientist Dr Ravi Anand has been awarded the Butt Smith Medal for his outstanding contribution to geoscientific research. The award acknowledges Dr Anand's long-term dedication and excellence in the development of geochemical mineral exploration techniques for Australia's deeply weathered landscapes.

Awarded by the Cooperative Research Centre for Landscape Environments and Mineral Exploration (CRC LEME) and CSIRO's Exploration and Mining Division, the Butt Smith Medal recognises sustained excellence in Australian geoscience research. The award takes its name from two eminent geoscientists, Dr Charles Butt and Dr Ray Smith, who through long association with CRC LEME and CSIRO, have made significant research contributions to the Australian minerals exploration industry.

CRC LEME Chief Executive Officer Dr Steve Rogers said it was fitting that Dr Anand becomes the second recipient of the Butt Smith Medal. "For more than three decades Dr Anand has followed in the footsteps of Dr Butt and Dr Smith to emerge as a leader in regolith research," Dr Rogers said. "His work into understanding how geochemical anomalies form in deeply weathered terrains has

contributed to the mineral industry's appreciation that regolith is an essential consideration when designing exploration strategies and interpreting geochemical data."

CSIRO Exploration and Mining Chief Dr Peter Lilly added that recently Dr Anand had discovered an association in plant biogeochemistry and mineralisation. "Some of Dr Anand's newer research has shown that deep-rooted mulga trees in transported regolith over some Australian mineral provinces act as hydraulic pumps for dissolved metals," Dr Lilly said. "His work has raised the awareness of a biological process that can create geochemical anomalies in the plant's biomass near the surface, which could become a valuable indicator for mineral explorers." The Butt Smith Medal complements Dr Anand's other research accolades including the Sir Ian McLennan Achievement for Industry, CSIRO Research and Stillwell Awards.