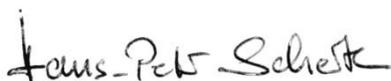


Minutes
1st Business Meeting
Video-Conference

Time: Monday, January 11th, 2021,
2:00 – 4:00 pm Central European Time (CET)

Location: Because of the Corona pandemic, a Video-Conference was organized

1. OPENING, WELCOME AND APPROVAL OF THE AGENDA
2. ROLL CALL OF THE DELEGATES
3. APPROVAL OF THE MINUTES OF THE BUSINESS MEETING MELBOURNE 2018
4. APPOINTMENT OF AN AUDITING COMMITTEE (IMA CONSTITUTION, ART. 5C)
5. REPORTS OF THE EXECUTIVE COMMITTEE
 - REPORT OF THE PRESIDENT
 - REPORT OF THE SECRETARY
 - REPORT OF THE COMMUNICATION OFFICER
 - REPORT OF THE TREASURER
6. REPORT OF THE IMA MEDAL COMMITTEE
7. NOMINATIONS FOR ELECTION OF COUNCIL MEMBERS
8. POTENTIAL CHANGES OF OFFICERS FOR COMMISSIONS
9. ESTABLISHMENT OF NEW COMMISSIONS AND WORKING GROUPS
10. REPORT ON THE IMA ARCHIVE
11. FUTURE GENERAL MEETINGS
 - IMA – 2022 (LYON, FRANCE)
 - IMA - 2026 OUTLOOK
12. OTHER BUSINESS



H.-P. SCHERTL
SECRETARY



P. CORDIER
PRESIDENT

1. OPENING, WELCOME AND APPROVAL OF THE AGENDA

The President opens the meeting and welcomes the participants. Participants agree on the agenda presented.

2. ROLL CALL OF THE DELEGATES

The voting procedure was recalled. National Representatives who are not able to attend, can be substituted by their representatives. The attendees of the Video-Conference were asked

to submit their votes by e-mail to former President Sergey Krivovichev, who agreed, together with a colleague of his choice, to act as Balloting Committee.

3. APPROVAL OF THE MINUTES OF THE BUSINESS MEETING IN RIMINI, 2016.

The minutes of the Business Meetings in Melbourne were unanimously approved.

4. APPOINTMENT OF AN AUDITING COMMITTEE (IMA CONSTITUTION, ART. 5C)

Marc Blanchard (France) and Heidi Höfer (Germany) were proposed and unanimously approved to act as the auditing committee.

5. REPORTS OF THE EXECUTIVE COMMITTEE

Report of the President

At the beginning of my mandate, which began in 2018 at our general assembly in Melbourne, I set two objectives for the IMA.

The first, "IMA-expand", was based on the realization that a large number of countries are not part of the IMA. In particular, we note on our membership map the absence of most African countries, some of which have significant mineral resources. I have therefore sought to contact as many people as possible in these countries. In spite of numerous returns and some fairly advanced discussions, I must say that no concrete progress has been made. The main difficulty is the lack of a federative structure of mineralogy in these countries. Achieving their emergence requires the identification of good contacts, but also time for this structuring to take place. Despite this negative result at this stage, I remain optimistic and convinced that it is important for the IMA to gather on the broadest possible basis. But also that we are in our role in helping colleagues, sometimes isolated, to achieve a structuring that will enable them to have easier contacts with international structures. I wish my successors more success in this area.

The second action was to synchronize the proclamation of a year of mineralogy with our next general assembly of 2022 in Lyon. I explored the possibility of an international year. Thanks to contacts with colleagues who had set up the International Years of Light, Physics and Crystallography, it soon became clear that 4 years was not enough time to put together such a dossier which, after having obtained the support of UNESCO, should lead to a resolution of the UN General Assembly. Moreover, I was informed that an International Year of Basic Sciences was already planned for 2022. Thanks to M. Zema, I was able to get in touch with the project's promoters. We came to the conclusion that this international year could be an umbrella that could house other projects such as a celebration of mineralogy. This international year, renamed International Year of Basic Sciences for Development, was labeled by UNESCO last November and the IMA is officially one of its founding members. Unfortunately, the COVID pandemic led to the deprogramming of many topics at the last UN General Assembly, including international years. The official proclamation of IYBSD2022 is therefore still pending. This action seems to me very important for the IMA on two levels. On the one hand, a globally visible action, benefiting from the patronage of UNESCO and the UN will represent an important dynamic for mineralogy and for our General Assembly. I therefore call on every mineralogist to contribute to this celebration of our discipline. In the longer term, I am convinced that participation in such international initiatives represents a development opportunity for the IMA. In this context, close relations with larger structures, such as the IUGS of which we are a member, will be very important. My job was essentially to make sure that this year was proclaimed and that it had the highest patronage to give it credibility. This is a chance to give our discipline more visibility. Its success will be judged by the dynamism of the actions that will be organized in the different countries, in the different cities, in the universities, in the schools. However, it is important that the IMA continues to play a sponsoring and unifying role until the end of 2022. For this

we need a structure and it seems to me that the most flexible form compatible with our statutes is a Working Group. I would therefore propose hereafter the creation of a Working Group dedicated to the organization of this year. At this stage some colleagues have already accepted to be part of this group: a former president, Sergey Krivovichev, two IMA medallists, Georges Calas and Eiji Ohtani, and Michele Zema of the IUCr who has been very active in the organization of the International Year of Crystallography. The Italian society should propose me a participant soon and I call on those who want to participate in the success of this year to join this group.

Patrick Cordier, January 11th, 2021

Report of the Secretary

First of all I would like to thank the organizers of the 22nd General Meeting of the International Mineralogical Association (IMA) 2018 for their outstanding engagement, hosting an exceptional and interesting conference which was attended by more than 600 participants from 38 countries. Besides talks, posters and different meetings, further activities were organized in the framework of the General Meeting. The 2017 IMA medalist Emil Makovicky (Copenhagen University, Denmark) presented a lecture on the mineralogy of thallium sulfosalts. Three student attendees (Philippe Belley, University of British Columbia, Vancouver; Stefan Farsang, University of Cambridge and Marek Tuhý, Charles University, Prague) were financially supported by receiving the IMA Ph.D. Student Award 2018 and in cooperation with Schweizerbart Science Publishers a Compendium of IMA-Approved Nomenclature was produced, edited by Schertl, Mills and Maresch. Due to the initiative of Alessandro Gualtieri (Italy) a new Working Group on "Asbestos, asbestiform minerals, and other respirable minerals that pose potentially negative health risks" was installed and unanimously approved by the delegates who attended the 2nd Business Meeting.

On January 15th 2019 the IMA Council organized a Skype Conference. Since our treasurer David Bich retired from his office, Peter Burns helped in finding a successor who is Travis Olds from the US, and whose installation was accepted unanimously by the IMA Council. With respect to the 2022 "Year of Mineralogy" event, Anton Chakmouradian came back to my idea preparing a calendar and suggested to put it into practice. He recommended the calendar to highlight not only mineral photos but also some turning points in the history of mineral sciences. Further ideas referred to thin section images, rock samples, cathodoluminescence images, spectacular excursion/field trip photos, antique crystallographical and mineralogical microscopes or instruments. Anton suggested a "layman-friendly" text to accompany it. Because of the Corona problems it did not become realized but still is one of the future projects.

The communication with our webmaster Wolfgang Zirbs at Vienna University is still very fruitful and a lot of improvements were made during the last 2 years. Key information currently presented on our website is on the IMA medalists Eiji Ohtani (2019) and Georges Calas (2020), on Tewite, the Mineral of the Year 2019, and on an outlook of the European Mineralogical Conference in Poland that became postponed to August 29 – September 2, 2021, the IMA General Meeting 2022 in Lyon, France, and on the Year of Mineralogy 2022 which takes place under the patronage of the International Year of Basic Science for Sustainable Development, approved by UNESCO. Postponed to August 24-26, 2021 is also the 9th international Conference Mineralogy and Museums, organized by Prof. Ruslan Kostov, Sofia, Bulgaria. This meeting is an integral part of the activities of the Commission on Museums and hold every 4 years.

Council- and Commission-Members of IMA were successfully represented at the XIX International Meeting on Crystal Chemistry, X-ray Diffraction and Spectroscopy of Minerals in Apatity, Russia (July 2019) with Plenary Talks of Patrick Cordier, Sergey Krivovichev, Peter Burns, Frédéric Hatert, Stuart Mills and Hans-Peter Schertl. The present IMA officers used the conference in Apatity for a short meeting. In October 2019 I invited our

IMA medalist 2019 Eiji Ohtani to Ruhr University Bochum; he presented an inspiring talk on high pressure experiments and their relevance to nature.

With respect to the "Catalogue of Type Minerals Specimen", I had several discussions in May 2020. Jacques Lapaire from Switzerland received from Dr. Nicolas Meisser from Lausanne, who is the current Chair of the IMA Sub-Commission on Type Minerals, this catalogue. Jacques worked for nearly 3 years in order to include the information that occurred between 2000 and 2020. He updated this list regularly and has put the recent one online. However, the list currently is only available via his personal website; it contains a tremendous amount of important information related to type minerals which is of course not in "The New IMA List of Minerals", since the mission of this list, regularly updated by the "Commission on New Minerals Nomenclature and Classification" is of course a different one. Thus I brought together Jaques Lapaire, Nicolas Meisser, Jeffrey de Fourestier (Sub-Commission of unnamed minerals), Mike Rumsey and Kim Tait (Commission on Museums) in order to discuss this topic and to find a platform where to publish these very valuable data.

Especially the cancelation of the European Mineralogical Conference in Poland because of the Corona-virus situation, originally scheduled for the year 2020, was very serious for IMA. We already established a very warm and friendly contact to our Polish colleagues because of our planned Business and Council Meetings and we also already organized our IMA 2018 and 2019 Medalists Gordon Brown and Eiji Ohtani to present their Medalist lectures. All this then became cancelled, as also the scheduled IMA Student Award 2020 to honor and support outstanding students.

In 2014 the IMA Council provided a sum of US\$ 10.000 for to financially support the work of the IMA Sub-Commission "Archive and History" and the work of our webmaster for 5 years. Since there is still material left that has to be sorted, digitalized and worked upon before it can be included into the archive and since the webmaster also needs constant attention, in August 2020 the IMA Council approved a sum of US\$ 5.000 for this work for the upcoming 5 years.

With respect to our Commissions, one problem refers to the Commission on Ore Minerals (COM), in that we did not get any response from Chair and Vice Chair. Even the Secretary did not have contact and he currently is the only active COM officer. During the last 4 weeks I had an intense e-mail exchange with the Secretary and provided him with a suitable contact to Ricardo Castroviejo from Spain; he and his group are very actively working on a spectral reflectance based compilation of ore minerals. Meanwhile they contacted each other and Ricardo promised to discuss with his colleagues possible partnership with COM. I am sure that through this contact and by recruiting young and innovative active scientists, a basis for a positive development in future is created.

One problem that I repeatedly need to address refers to the "response behavior" of the National Representatives. Some colleagues are extremely helpful by sending regular updates, from some colleagues we unfortunately do not receive any message.

Finally, it is my sad duty to inform you of the death of Prof. Anton Preisinger on June 29, 2020, who was a founding Member of the IMA and Secretary between 1964 and 1970. End of December 2020 Prof. Ekkehart Tillmans passed away. He was IMA Councillor between 2006 and 2010 and IMA President between 2010 and 2012. Since then he was active as Vice Chair on the IMA Subcommission "Archive and History". We are very grateful for their work and will always keep them in honorable memory.

Hans-Peter Schertl, January 11th 2021,

Report of the treasurer

I took over the role from Drs. David Bish and Peter Burns in January 2020. The 2020 membership dues were sent to all members in June 2020 and the response rate was quite low; roughly one-third of members are unreachable or unresponsive. In November, I sent Hans-Peter and Patrick an updated listing with current membership group designations. The group designation list was partially inaccurate; in particular one change to the group designation for our French members from D to C that was made in 2017 had not been updated. I also maintain a list with several updated contact addresses from latest responses

and role changes. Bulgarian members have opted to pay dues several years in advance to compensate for the high fees of multiple small wire transfers, and this could be a wise option for others. It is not my goal to be a debt collector, but it has been difficult to determine which memberships are current or delinquent, mainly because of the limited (or no) contact with many of the members, but also because the source details of incoming wires have to be checked by our accountant individually. Peter Burns and I are working on sending a series of documents pertaining to our tax-exempt status to Annamaria for archival. New Zealand resigned their membership.

In 2019:

Beginning balance: \$111,084.58
Total interest from money market dividends: \$1749.93
Total deposits from membership dues: \$2962
Total withdrawals (including transfer fees): \$799.78
Year-end balance: **\$114,996.73**

In 2020:

Beginning balance: \$114,996.73
Total interest from money market dividends: \$229.79 (~\$1 per month since March)
Total deposits from membership dues: \$4815
Total withdrawals (including transfer fees): \$9068.86
Year-end balance: **\$110,972.66**

Summary of expenses in 2020:

9/01/20: Funds wired \$2312.36 for IMA archive and website work – to Annamaria Kis; 840 euro, \$1019.76, \$100 transfer fee, and to Wolfgang Zirbs; 900 euro, \$1092.60, \$100 fee.
6/16/20: Funds wired \$5881.50 (5000 euro) to International Union of Pure and Applied Physics, for partner activities supporting the International Year for Basic Science for Sustainable Development, which will host the year of Mineralogy 2022.
6/4/18: Funds issued to Elements for sponsored piece in the April 2020 issue on the Bulgarian Mineralogical Society, \$850.00 (+\$25 transfer fee)

There is one major point I need to bring to everyone's attention that involves considering updates to our investment strategy. With the onset of the pandemic and market crash in early 2020, our interest received from money market dividends has slowed to a crawl, averaging below \$1 USD per month since March (in 2019, we averaged ~\$145/month). The U.S. Federal interest rates are expected to remain very low for the next few years, and some projections suggest that near zero rates could last until at least 2023, after which it may increase quite slowly. Since we rarely need access to the entirety of our funds, we should consider placing a portion into a new low-risk strategy that can accomplish two things; first, to not lock up any money needed for immediate use, and secondly to generate higher interest than the expected \$10-\$20/year for the next few years. I have asked Edward Jones to prepare several strategies for this year and can share those options when they arrive.

Travis Olds, Jan 12th 2021

Report of the Communication Officer

Since 2018, when the previous Business Meetings were held at IMA-2018 in Melbourne, the Association has remained active on its conventional communication platforms. We have maintained good business relations with the Elements magazine, which still provides space for IMA news and announcements on a pro bono basis (see attached). In addition, the Association has been sponsoring publications by its member organizations – most recently, by the Bulgarian Mineralogical Society (BMS, April 2020, p. 144; see attached). The featured organization is typically chosen from those that are planning to hold a major conference in the following 12-18 months (in the BMS case, Mineralogy and Museums 9 in Sofia). These contributions are intended to introduce a wide global readership to mineralogical societies

and associations outside the Elements sponsorship group. Although the IMA is charged for these publications (in 2020, \$850 US per page), this work is important in helping our member organization to improve their international visibility and inform the mineral science community at large about their conference and publishing activities. The next IMA-sponsored publication will be on the Mineralogical, Petrological and Geochemical Society of China (MPGSC), which will likely be hosting the 2026 General Meeting (see below). On the run up to IMA-2022, another important prospective publication in Elements will be “interviews” with the IMA Medal of Excellence winners on the past, present and future of mineral sciences (slated for October 2021).

The IMA Facebook page (www.facebook.co./InternationalMineralogicalAssociation) has been our principal vehicle of reaching out to younger people and those interested in minerals non-professionally. In addition to news and announcements, this page is used to share interesting articles about minerals, rocks, gemstones, lab and field research, and repost selected announcements published by our member organization (see attached). Our Facebook presently has more than 2,600 followers.

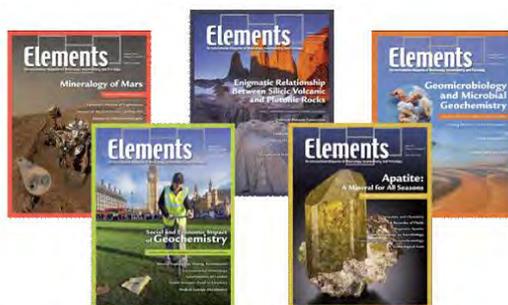
In 2016, the leadership of the Mineralogical Society of South Korea (MSSK) expressed their interest in hosting the 2026 General Meeting in Seoul. They were instructed on how to proceed with their bid but eventually decided not to submit a proposal to the IMA because of uncertainties involved in conference organization. It is possible that the MSSK will revive this idea at some point in the future. Attempts to “rally up” some support for bringing one of the future IMA meetings to the USA, which were discussed at length in 2020, have so far not resulted in anything concrete. As it stands, the MPGSC is the only viable candidate to host IMA-2026.

As Communication Officer, I have also been involved in organizing the online publication of the International Encyclopedia of Minerals (IEoM), launched in the 1990s as an international undertaking (75 contributors from 21 countries) by J.A. Mandarino. The publication has been approved by the Subcommittee on the IMA Archive, who have allocated resources for this project. This project is presently still in its editing stage, handled essentially single-handedly by Malcolm Back (Royal Ontario Museum), who inherited the Encyclopedia files from Mandarino.

Co-operation between the IMA and the Guinness World Records (GWR) started in 2019 and was meant to help popularization of mineral sciences. I have since helped the GWR editorial staff to verify and correct several mineral-related record entries, but it is not clear at this point whether this could evolve into a lasting, mutually beneficial arrangement. Obtaining the type of information that is of particular interest to the GWR (statistics of new mineral discoveries, largest mineral collections, most valuable gemstones, etc.) would have to involve specific commissions (CNMNC, Gem Materials, Museums) and probably require additional time commitments from their memberships. Thus, the practicality and potential benefits of further cooperation with the GWR will need to be assessed prior to going forward.

Anton R. Chakhmouradian, January 8 - May 22, 2021

Attachment to the Report of the Communication Officer:



Publications in Elements (elementsmagazine.org):

- ◆ News and announcements
- ◆ Reports
- ◆ Sponsored articles by adhering organizations



International Mineralogical Association

www.ima-mineralogy.org

of Canada for 30 years. Hughes earned his bachelor's degree from Franklin and Marshall College (Pennsylvania, USA) in 1975, and his MA and PhD degrees from Dartmouth College (New Hampshire, USA) in 1978 and 1981, respectively. In 1980, he was a pre-doctoral fellow at the Geophysical Laboratory of the Carnegie Institution of Washington.

Young Scientist Award to Matthew Steele-MacInnis

The MAC Young Scientist Award is given to a young scientist who has made a significant international research contribution, which is taken to be a promising start to a scientific career. This year's awardee is Matthew Steele-MacInnis, an assistant professor at the University of Alberta (Canada).



Matthew Steele-MacInnis is an assistant professor in the Department of Earth and Atmospheric Sciences at the University of Alberta (Canada). He received his BS in Earth sciences from Memorial University in his native Newfoundland in 2008, and his PhD in geosciences from Virginia Tech (USA) in 2013. He was a Marie Curie postdoctoral fellow at ETH (Eidgenössische Technische Hochschule) Zurich (Switzerland) from 2013 to 2015, and then an assistant professor at the University of Arizona (USA) from 2015 to 2017 before moving to the University of Alberta.

Matt's research focuses on hydrothermal fluids and how they interact with rocks, particularly in the context of ore formation. He combines field and analytical studies with thermodynamic modeling to investigate fluid-driven processes in settings ranging from subduction zones to magmatic-hydrothermal systems to sedimentary basins. Much of his research has focused on developing quantitative tools and approaches to evaluate the physical and chemical properties of fluids, and the application of these tools in deciphering geologic processes.

Matt serves as an associate editor for the *Canadian Mineralogist*. He was the recipient of a CAREER grant from the US National Science Foundation and received the Hisashi Kuno Award from the American Geophysical Union in 2017.

UPCOMING GAC-MAC-IAH 2019 JOINT MEETING

Where Geosciences Converge

Québec, QC, Canada

12–15 May 2019

The Geological Association of Canada (GAC@), the Mineralogical Association of Canada (MAC) and the Canadian National Chapter of the International Association of Hydrogeologists (IAH-CNC) are currently preparing the GAC-MAC-IAH/CNC 2019 conference. **We invite you to mark 12–15 May 2019 on your calendar so you won't miss this event.** The conference will be held in historic Québec City, a UNESCO World Heritage site. Participants will have the opportunity to visit and discover the warmth and charms of this beautiful city and to explore its many attractive nearby natural sites. Under the theme "Where Geosciences Converge", the organizing committee wishes to promote collaboration and stimulating discussion among geologists, mineralogists, petrologists, hydrogeologists, geophysicists and geochemists. The conference will highlight the following themes:

- Geosystems and hydro-geosystems
- Resources, energy and environment
- Data science for geosciences
- Geosciences and society

Check gacmac-quebec2019.ca for more info and watch for our call for abstracts scheduled to open 1 November 2018.

HOPE TO SEE YOU IN QUEBEC CITY!

PETR ČERNÝ (1934–2018)

Petr Černý was born in Czechoslovakia and was a graduate of Masaryk University in Brno. But it was at the Czech Academy of Sciences in Prague in the 1960s, while working on his PhD in western Moravia, that nurtured a lifelong fascination with granitic pegmatites. After the Warsaw Pact invasion of his home country in August 1968, he came to the University of Manitoba (Winnipeg, Canada) as a post-doctoral fellow and went on to have a stellar career in the field of pegmatite research. Petr's erudite approach to these unusual rocks led to a qualitatively new level of understanding, to refined petrogenetic and mineral deposit models, and to improved classification schemes. He worked on pegmatites from the Czech Republic, Argentina, southern Africa, Scandinavia and many other regions, but the Tanco Pegmatite vein in eastern Manitoba remained his primary source of inspiration and a testing ground for new ideas. Petr retired in 1999 but continued his important work for another 18 years as professor emeritus, in spite of a rapidly progressing Parkinson's disease. His research produced over 320 publications in refereed journals, two monographs, plus numerous reports, field guidebooks and conference presentations.

Petr's outstanding contributions to Earth sciences were recognized by many professional organizations the world over. Among these recognitions, Petr was the dedicatee of three thematic issues of the *Canadian Mineralogist* (in 1998 and twice in 2012); a Corresponding Member of the Asociación Geológica Argentina (2001), awarded the Friedrich Becke Medal from the Österreichische Mineralogische Gesellschaft (1994); awarded the Logan Medal from the Geological Association of Canada (1993), the Pošepný Gold Plaque from the Czech Academy of Science (1993), the Bofický Medal from Charles University in Prague (1991), the Gold Medal and Honoris Causa Doctorate from Masaryk University (1991), the Past President's Medal from the Mineralogical Association of Canada (1984), and the Médaille A.H. Dumont from the Geological Society of Belgium (1981). Petr had the new mineral Černýite named in his honour (Kissin et al. 1978, *Canadian Mineralogist*, 16, 139–146) and, last but not least, he had his own personal hardhat at the Tanco Ta-Cs pegmatite mine in Manitoba.

In his life and work, Petr Černý was supported by his wife, Iva, and the International Mineralogical Association sends to her our condolences on this irreplaceable loss. Fellow pegmatite researchers will remember Petr as an extremely knowledgeable, friendly and helpful person who gave enthusiastic conference talks and insightful tours of the Tanco pegmatite. Both Petr and Iva were instrumental in the preservation and growth of the R. B. Ferguson Mineral Museum at the University of Manitoba, which remains an important facility for teaching and outreach.





XXII GENERAL MEETING OF THE INTERNATIONAL MINERALOGICAL ASSOCIATION (IMA2018)

www.ima2018.org.au

IMA2018 MEMORIES

The XXII General Meeting of the International Mineralogical Association, IMA2018, was held 13–17 August 2018 at the Melbourne Convention Exhibition Centre in beautiful downtown Melbourne (Australia) and was hosted by the Geological Society of Australia (<https://www.gsa.org.au/>). Six hundred people from 38 different countries attended five days of talks, one day of workshops, and pre- and post-conference fieldtrips.



IMA President Patrick Cordier (far right) and Past President Peter Burns (far left) with the IMA PhD Student Award recipients (left to right): Stefan Farsang, Philippe Belley and Marek Tuhý.

The ten plenary sessions were both packed out and insightful. Jill Banfield (University of California at Berkeley, USA) discussed her research group's work on high-resolution transmission electron microscopy, a technique which is now able to image individual layers in smectite clays. Frank Reith (University of Adelaide, Australia) presented his research on gold and platinum, elements long thought to be immobile but which actually possess microbially driven geochemical cycles. Juraj Majzlan (University of Jena, Germany) discussed his work on a wide variety of mine drainage sites and the importance of understanding the solubility and thermodynamic properties of minerals to properly remediate contaminated areas. Janice Bishop (SETI Institute, California, USA) discussed mechanisms for the formation of phyllosilicate and sulfate minerals, which are likely to have formed in warm waters early in the history of Mars. Motohiko Murakami (ETH Zurich, Switzerland) described his work on mineralogy at the extreme environment of the core–mantle boundary, which stemmed from his discovery of the post-perovskite $MgSiO_3$ phase in 2004. The 2017 IMA medalist Emil Makovicky (Copenhagen University, Denmark) presented a lecture on the mineralogy of thallium sulfosalts, a fascinating group of minerals which typically display metal–metal interactions. Peter Burns (University of Notre Dame, Indiana, USA) reviewed recent developments in uranium mineralogy, from sklodovskite to bluelizardite to paddlewheelite. Paul Agnew (Chief Geologist with Rio Tinto Exploration) discussed the role of mineralogy in mineral exploration: the techniques available are ever more sensitive, but it is also becoming more and more difficult to find new deposits. Kathryn Goodenough (British Geological Survey) presented her research on the rare-earth elements, postulating that their increasing demand could result in the opening of new mines to exploit as-yet-untapped deposits. Sergey Krivovichev (Saint Petersburg State University, Russia) presented his work on the information contained in mineral structures: while not as complex as biological structures, minerals can be ranked using complexity analysis by treating the unit cell as a box of information. These one-sentence overviews cannot do justice to the quality of each speaker, but they do provide an idea of the scope of the plenary talks in which each speaker discussed different frontiers in mineralogical science. All were thought-provoking for the attendees.



Excursion to Organ Pipes National Park in the outskirts of Melbourne.

The IMA PhD Student Award enabled three students to present their research in Melbourne. In his presentation, Marek Tuhý (Charles University, Czech Republic) explained how his mineralogical and stable-isotope studies help model the behaviour of metals around mine and processing sites. Stefan Farsang (University of Cambridge, UK) unraveled the fate of carbonates in subduction zones, and Philippe Belley (University of British Columbia, Canada) gave a talk on chemical fingerprinting of gem spinels.

Several trends in mineralogy were frequently touched upon through the course of the conference. Microbes and their role in mineralogical processes are becoming an increasing presence in a science long considered mostly inorganic. Processes relating to iron oxides were also a common topic of discussion, including the role of microbes in a (bio)geochemical iron cycle. The cycling of our 'old favourite' gold dominated talks about the world's best-known precious metal. Lithium also garnered considerable interest at IMA2018, given its potential for uses in efficient batteries, among other applications. Uranium was a focus of many talks, thanks to its structural versatility, continuing uses in some industries, and possible mineralogical methods for storing radioactive waste. Environmental mineralogy was also a highly popular discussion point, often taking the form of leaching studies, or finding a 'greener' way to process minerals or ores by which to access the element of interest. Minerals or mineral-like structures are finding applications in the field of material science, while the role of mineralogists in exploration geology is becoming increasingly important.

One of the most consistently controversial topics in mineralogy – new minerals and related issues – did not fail to deliver. Several talks were presented on mineral diversity, estimates of the number of as-yet-unknown minerals, and related debates about when a mineral becomes too 'anthropogenic' to retain validity as a 'natural' species. The IMA in cooperation with Schweizerbart Science Publishers also published *A Compendium of IMA-Approved Nomenclature* (2018, Edited by Schertl, Mills and Maresch), which covers all the up-to-date papers on mineral and mineral group nomenclature: this includes garnets, epidotes, apatites, tourmalines, pyroxenes, amphiboles, zeolites, sulfosalts, perovskites, pyrochlores and hydrotalcites.

On behalf of the delegates, the IMA thanks the Local Organizing Committee of Andy Christy, Sue Fletcher, Bill Birch, Dermot Henry, Joel Brugger and Pete Williams for all their hard work. We all now look forward to the next IMA General Meeting in Lyon (France) (<http://www.ima2022.fr/>)!

Stuart J. Mills¹ (Chair of IMA2018) and Owen P. Missen^{1,2}

¹ Geosciences, Museums Victoria, GPO Box 666, Melbourne 3001, Victoria, Australia

² School of Earth, Atmosphere and Environment, Monash University, Clayton 3800, Victoria, Australia

REFERENCE

Schertl H-P, Mills SJ, Maresch WV (Eds) (2018) *A Compendium of IMA-Approved Nomenclature*. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart, Germany, 353 pp



BRINGING THE GLOBAL MINERALOGICAL COMMUNITY TOGETHER



Patrick Cordier

The year 2018 was an important one for mineralogists. Every four years, all of us from around the world – in spirit if not in body – gather together for the General Meeting of the International Mineralogical Association (IMA). Melbourne (Australia) was selected to play host to the 22nd General Meeting of the IMA, which was held 13–17 August 2018. This meeting was a very important highlight in the life of our association: 600 colleagues from 38 different countries responded to the invitation of Stuart Mills, Chair of IMA 2018 (Mills and Missen 2018). In Melbourne, Peter C. Burns passed the

symbolic wheel of presidency (Fig. 1) to me, and so I began my turn as the 18th President of the IMA for the now traditional two-year term. We held three council meetings and two, widely attended, business meetings where IMA affairs were discussed, the activities of the six existing IMA Commissions (<https://www.ima-mineralogy.org/comm-work.htm>) were reviewed, and a new working group on asbestos-related issues was launched. On this occasion, the new IMA Council was elected:

President	Patrick Cordier (France)
Past-President	Peter C. Burns (USA)
1 st Vice-President	Anhual Lu (China)
2 nd Vice-President	Razvan Caracas (France)
Secretary	Hans-Peter Schertl (Germany)
Treasurer	David L. Bish (USA)
Comm. Officer	Anton R. Chakhmouradian (Canada)
Councillors	Jane A. Gilotti (USA), Catherine A. McCammon (Germany), Marco Pasero (Italy), Mark Welch (UK), Sergey Smirnov (Russia)

Emil Makovicky (Copenhagen University, Denmark) received the 2017 IMA Medal and presented a lecture on the mineralogy of thallium sulfosalts. The IMA Medal is awarded for excellence in mineralogical research, as represented by a career-long record of outstanding scientific contributions in the field of mineral sciences. It is considered one of the pre-eminent awards in mineralogical research and represents a lifetime achievement award. It is important to remember that an award not only benefits its recipient but also the mineralogical community as a whole. By highlighting the recipient's best achievements, awards are also an inspiration and set the bar for others to match and even to exceed. So, please take the time to honor the accomplishments of your valued colleagues by nominating them. With everyone's help, we can ensure that the Medal Committee will have a diverse and most deserving pool of candidates. Nominators can be either individual members of any mineralogical society or group, or their appointed National



The IMA 'Wheel of Presidency'.

Representative. Nominations for the IMA Medal must be submitted to the Committee Chair by 1 April 2020. Practical information on the contents of a nomination package and procedure can be found on the IMA website, at www.ima-mineralogy.org/Medal_nominations.htm.

Founded in 1958, the IMA is the world's largest organization promoting mineralogy. Thirty-nine national mineralogical societies or groups are presently members of the association. However, there are still many blanks on the world map that are outside of the IMA's reach, especially on the African continent, where mineral resources are so important. Promoting the development of a worldwide mineralogical community is one of the principal missions of the IMA. For a national mineralogical society, joining the IMA will provide the opportunity to gain international visibility and forge collaborations on a truly global scale. In some cases, there may be interest in joining the IMA but a national mineralogical society has not been established because a critical mass has not been reached. It is even more important for our colleagues from those countries to find a way to assemble, for instance, by creating a section, group, or a subgroup within a larger learned society. The current IMA membership includes several such groups (Novák 2016; Christy and Downes 2018). The IMA is willing to help initiate such groups in order to ensure the most inclusive representation possible worldwide.

The importance of mineralogy in the natural resource sector and environmental studies makes it a cornerstone of modern science. Every country is concerned. And we encourage those currently outside the IMA's orbit to join us and to contribute to the advancement of our discipline.

Patrick Cordier, IMA President

REFERENCES

- Christy AG, Downes P (2018) Mineralogical organizations in Australia. *Elements* 14: 208
- Mills SJ, Missen OP (2018) XXII General Meeting of the International Mineralogical Association (IMA2018). *Elements* 14: 435
- Novák M (2016) Czech Geological Society: Mineralogical Section. *Elements* 12: 219



International Mineralogical Association

www.lma-mineralogy.org



Gordon Brown

The IMA is honored to present its 2018 Medal of Excellence in Mineralogical Sciences to Gordon E. Brown. Gordon is the Dorrell William Kirby Professor Emeritus of Geology (Stanford University, California, USA) and Professor Emeritus of Photon Science at the Stanford Linear Accelerator Center (SLAC) (California, USA). His contributions to environmental geochemistry, mineralogy and surface science have received international recognition. He has authored or co-authored over 400 refereed publications, achieving a remarkable h-index of 103.

Following his undergraduate years at Millsaps College (Mississippi, USA), Gordon received an MSc (1968) and a PhD (1970) degrees from Virginia Tech (USA). As a postdoctoral fellow (1970–1971) in the State University of New York at Stony Brook (USA) he carried out X-ray studies of lunar samples from NASA's Apollo missions and perfected high-*T* single-crystal X-ray diffraction techniques. In 1973, after two years as a faculty member at Princeton University (New Jersey, USA), Gordon moved to Stanford, where he developed an internationally acclaimed program in environmental, surface and aqueous geochemistry. Gordon, his students and collaborators developed synchrotron radiation-based spectroscopic and imaging methods and applied them to a range of geochemical and mineralogical problems. They pioneered X-ray absorption spectroscopy studies of the local structural environments of atoms in minerals, glasses, melts, and at mineral–solution interfaces, as well as in situ X-ray photoelectron spectroscopy studies of mineral reactions

with water. The use of synchrotron radiation enabled Gordon's group to conduct ground-breaking research on molecular-level speciation of As, Se, Hg, U and other contaminants at mine and nuclear waste disposal sites, and on the structure and properties of natural and engineered nanoparticles. Most recently, he and his collaborators have examined CO₂ sequestration via mineral carbonation and chemical reactions of fracking fluids with minerals and natural organic matter in oil and gas reservoirs. It is impossible to overestimate the importance of this work to environmental stewardship and to the responsible recovery of hydrocarbons.

Gordon's research has been recognized through many prestigious awards, including the Hallimond Lecture (Mineralogical Society of Great Britain and Ireland, 1993/4), the Hawley Medal (Mineralogical Association of Canada, 2007), the Clair C. Patterson Award (Geochemical Society, 2007), the Roebling Medal (Mineralogical Society of America, 2007), the Ian Campbell Medal (American Geosciences Institute, 2012), and foreign membership of Academia Europaea (2013).

Gordon has also made an outstanding contribution to the support and advancement of science in his roles as co-director of the US National Science Foundation's (NSF) Center for Materials Research (1987–1989), Chair of the Department of Geological and Environmental Sciences at Stanford (1986–1992, 2012–2015) and of the Department of Photon Science at the Stanford Linear Accelerator (SLAC) (1998–2007), Director of the Stanford-based NSF Environmental Molecular Science Institute (2004–2011), and as a member of many evaluation and steering panels – including as Principal Editor of *Elements* (2014–2017).

RARE MINERALS FOR RESEARCH

FROM our inventory of over 200,000 specimens, we can supply your research specimen needs with reliably identified samples from worldwide localities, drawing on old, historic pieces as well as recently discovered exotic species. We and our predecessor companies have been serving the research and museum communities since 1950. Inquiries by email recommended.



Pure samples suitable for standards are readily available. Pictured above are: Zircon from Malawi, Fluorapatite from Mexico, and Spinel from Myanmar.

Excalibur Mineral Corp.

1885 Seminole Trail, Ste 202, Charlottesville, VA 22901-1160, USA
Telephone: 434-964-0875; Fax: 434-964-1549
www.excaliburmineral.com | email: info@excaliburmineral.com

NEW CrystalMaker X THE BEST SOFTWARE FOR CRYSTAL STRUCTURES JUST GOT BETTER

CrystalMaker

INTERACTIVE VISUALIZATION AND MODELLING FOR GEOMATERIALS

The best way to understand mineral structures and their properties
Say goodbye to dusty crystallography - bring crystals to life!

ABO₂
MINERAL
STRUCTURE
ready to go
INSTANT
DISPLAY

Real native software
We do things properly

Mac Windows Compatible

1994-2019
25 Years of Innovation
We innovate - others imitate

CrystalMaker Software Ltd
Oxford - England

WWW.CRYSTALMAKER.COM

Download a FREE Demo
Now Make Your Own

Ideal for Teaching & Research



International Mineralogical Association

www.ima-mineralogy.org

2019 IMA MEDAL TO EIJI OHTANI



The International Mineralogical Association (IMA) is honored to present its 2019 Medal of Excellence in Mineralogical Sciences to Professor Eiji Ohtani. Professor Ohtani received his BSc degree in petrology in 1973 from Tohoku University (Japan). He received his MSc degree (1975) and his PhD degree (1979), both in geophysics, from Nagoya University (Japan). His professorial career began in 1980 at Ehime University (Japan), where he stayed until 1988. From then he continued at the Department of

Earth and Planetary Materials Science at Tohoku University, from where he retired in 2016.

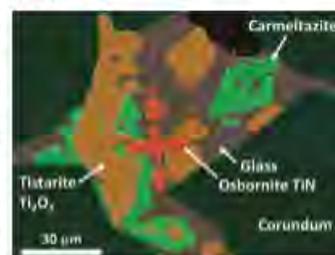
Professor Ohtani was the first person to perform successful melting experiments on minerals and rocks at $P > 10$ GPa using the then-revolutionary multi-anvil technology. He determined the precise melting relations of major mantle minerals, and he modeled phase relations at pressures equivalent to those of the uppermost lower mantle. He also invented techniques to measure density changes in molten rocks under very high pressures and used these techniques to constrain density contrasts between melts and minerals in the mantle. This pioneering work led to the development of the deep magma ocean model in 1985. Since the mid-1990s, Professor Ohtani has built an international reputation with his studies of water storage in the mantle. He measured the solubility of hydrogen in such nominally anhydrous minerals as olivine, majorite, and bridgmanite and demonstrated that the presence of water in mantle phases significantly affects their phase boundaries, something that could explain the topographic variations in the 410 km and 660 km seismic discontinuities.

In parallel with probing the mantle, Professor Ohtani actively explored the Earth's deepest interior and made impactful contributions on element partitioning between the mantle and core and on phase relations in the Fe–O (= Si, H, S) systems. In particular, his research demonstrated that both O and Si are the most likely light-element constituents in the outer core. In addition, his investigations of high-pressure polymorphism in shocked meteorites led to the discovery of coesite, stishovite, and seifertite (one of the densest SiO_2 polymorphs) in lunar materials, and of olivine breakdown to periclase plus bridgmanite in a shocked Martian meteorite. Professor Ohtani's publication record comprises over 360 peer-reviewed articles and is remarkable for its originality and influence.

Professor Ohtani has received a large number of honors, including the Mineralogical Society of Japan Award (1997), the Reimei Research Award from the Atomic Energy Research Institute of Japan (1998), the Norman L. Bowen Award (2007) from the American Geophysical Union, the Medal of Honor (Purple Ribbon) from the Government of Japan (2010), the Urey Award from the European Association of Geochemistry (2017), and the Humboldt Research Award (2017). He holds fellowships in the Mineralogical Society of America, American Geophysical Union, Geochemical Society, and European Association of Geochemistry, and has received many prestigious guest, distinguished, and visiting-professor appointments, most recently as Distinguished Affiliated Professor at the University of Bayreuth (Germany) to run from 2016 to 2021.

MINERAL OF THE YEAR 2018

At long last, and after much deliberation, the IMA Commission on New Minerals, Nomenclature and Classification is pleased to announce its chosen Mineral of the Year 2018. The "race" was tight and there were many worthy contenders. But the winner is a true gem, or, at least, was presented as such in the media. The new complex



oxide **carmelazite** ($\text{ZrAl}_2\text{Ti}_4\text{O}_{11}$) forms black inclusions in blue corundum crystals ("Carmel Sapphire™") from Cretaceous pyroclastic rocks and associated alluvial deposits at Kishon Mid-Reach in northern Israel. Its name alludes to the type locality at Mt. Carmel and the three principal metals in its formula (Ti, Al and Zr). Carmelazite was discovered by William L. Griffin (Macquarie University, Australia), Sarah E.M. Galt (University of Western Australia), Luca Bindi (Università degli Studi di Firenze, Italy), Vered Toledo (Shefa Gems Ltd., Israel), Fernando Cámara (Università degli Studi di Milano, Italy), Martin Saunders (University of Western Australia), and Suzanne Y. O'Reilly (Macquarie University). Since its description was published in *Minerals* (Griffin et al. 2018), the mineral has gained much publicity online as "the world's newest gemstone" (Andrews 2019), and even an "extraterrestrial mineral harder than diamonds" (Flatley 2019). Although perfectly terrestrial in origin and not particularly gemmy, the Mineral of the Year 2018 does contain Ti^{3+} , altogether rare in the geological environment, and possesses a peculiar crystal structure, which is remotely related to the close-packed arrangement of spinel. As can be seen from its formula, the structure of carmelazite is cation- and anion-deficient relative to spinels, while its symmetry is reduced to orthorhombic. Perhaps even more remarkable than its public image or structure is the association of carmelazite with other Ti^{3+} and carbide minerals, which indicates very unusual geological conditions in their volcanic cradle and promises new exciting discoveries in the future (Griffin et al. 2018).

We would also like to acknowledge here the close runners-up, which included the modular carbonate-phosphate-silicate aravallite from pyrometamorphic rocks of the Hatrurim Complex in Israel (Krüger et al. 2018) and the first-ever tin sulfate gemplesite from the Oktyabr'skoe Cu–Ni–Pd–Pt deposit in Siberia (Russia) (Pekov et al. 2018). Once again, we congratulate Bill Griffin and his co-authors on their discovery and encourage all readers of *Elements* to find out more about this remarkable mineral from the *Minerals* article.

REFERENCES

- Andrews AM (2019) Carmelazite the world's newest gemstone. *EraGem*, <https://eragem.com/news/carmelazite-worlds-newest-gemstone/> (retrieved 10 January 2020)
- Griffin WL and 6 coauthors (2018) Carmelazite, $\text{ZrAl}_2\text{Ti}_4\text{O}_{11}$, a new mineral trapped in corundum from volcanic rocks of Mt Carmel, northern Israel. *Minerals* 8: 601, doi: 10.3390/min8120601
- Flatley H (2019) Extraterrestrial mineral harder than diamonds discovered in Israel. *The Vintage News*, <https://www.thevintagenews.com/2019/01/15/carmel-sapphire/>, (retrieved 10 January 2020)
- Krüger B and 6 coauthors (2018) Aravallite, $\text{Ba}_2\text{Ca}_{18}(\text{SiO}_4)_6(\text{PO}_4)_3(\text{CO}_3)\text{F}_2\text{O}$: modular structure and disorder of a new mineral with single and triple antiperovskite layers. *Acta Crystallographica B* 74: 492–501
- Pekov IV and 7 coauthors (2018) Gemplesite, $\text{Ca}_2\text{Sn}(\text{SO}_4)_2(\text{OH})_6 \cdot 3\text{H}_2\text{O}$, a new mineral of the fleischerite group: first occurrence of a tin sulfate in nature. *European Journal of Mineralogy* 30: 375–382



Bulgarian Mineralogical Society

www.bgminsoc.bg



HISTORY

Have you heard of the International Conferences on Mineralogy and Museums? If you have not, the next one (MM9) is being organized by the Bulgarian Mineralogical Society (BMS) and will take place 5–7 July 2020 at the Earth and Man National Museum in Sofia (Fig. 1). The BMS (Българско минералогическо дружество) is one of the oldest members of the



FIGURE 1 Earth and Man National Museum, Sofia.

IMA: two of its members attended the inaugural IMA meeting in Zürich (Switzerland) in 1959. The eminent Bulgarian mineralogist Ivan Kostov (1913–2004) served as a national representative in the IMA from 1959 to 2004, further contributing as a councilor (1970–1974), vice-president (1978–1982), president (1982–1986) and past-president (1986–1990). Bulgaria hosted the 13th IMA General Meeting in the beautiful seaside city of Varna in 1982. The Bulgarian mineralogical community has made significant contributions to the activities of various IMA commissions and working groups.

The BMS was founded as an independent professional organization on 21 February 1990 in Sofia. Prior to that, mineralogists, as well as some geochemists and petrologists, had been an active group within the Bulgarian Geological Society (BGS) (www.bgd.bg) in its Mineralogical Section. For example, the first President of the BGS, elected in 1925, was the pioneer Bulgarian mineralogist and petrographer Georgi N. Bonchev (1866–1955) (Fig. 2), who also served as Rector of Sofia University (1914–1915). One of his greatest contributions to the advancement of mineral sciences in Bulgaria was writing the first university textbooks on mineralogy, crystallography, and petrography in Bulgarian. Classification of minerals on a geochemical and crystal chemical basis was the backbone of Ivan Kostov's 1957 textbook *Mineralogy*, its subsequent 1973 and 1993 editions, and its translation into English in 1968 and Russian in 1971.



FIGURE 2 Georgi Bonchev

The BMS membership has, over the years, remained at a roughly 50 professionals (mineralogists, crystallographers, geochemists, petrologists, and mineral deposit geologists), as well as some amateur mineral enthusiasts. Most of the professional members are affiliated with universities or institutions of the Bulgarian Academy of Sciences (Sofia University "St. Kliment Ohridski"; University of Mining and Geology "St. Ivan Rilski"; Geological Institute "Acad. Strashimir Dimitrov"; Institute of Mineralogy and Crystallography "Acad. Ivan Kostov"; National Museum of Natural History), as well as the Ministry of Culture (Earth and Man National Museum). Academician Ivan Kostov (Fig. 3) was elected the first President (1990–1995) and Honorary President of the BMS. Several other mineralogists served as its presidents later on, and two of them – Jordanka Mincheva-Stefanova and Dobrinka Stavrakeva – were also elected as its honorary presidents.



FIGURE 3 Ivan Kostov

ACTIVITIES

The BMS organizes annual meetings, either on its own or jointly with the BGS. General meetings take place every three years. Both Bulgarian nationals and foreign scholars who have made significant contributions to the advancement of mineralogy in Bulgaria can be elected as honorary members of the society. Preparations are currently underway for MM9 (<http://www.bgminsoc.bg/wp-content/uploads/2019/06/MM9CircularWeb.pdf>). (Tune in regularly for COVID-19 related updates). The scientific program will include four sessions: Mineralogical Research and Museums; Archaeomineralogy and Cultural Heritage; Collection Management and Development; Museums, Environment and Society.

Members of the BMS have been principally responsible for the systematic regional study of Bulgarian mineralogy, as well as of crystal morphology and the chemistry of different ore and associated minerals. Among these, of major importance to Bulgaria, has been the study of Cu–Au deposits in the Srednogie Zone and of the Pb–Zn deposits in the Rhodope Mountains. To date, some 500 minerals, including 11 new species, have been identified in Bulgaria. A few of these new discoveries remain unique. Other "Bulgarian" minerals, such as strashimirite [Cu₈(AsO₄)₄(OH)₄·5H₂O] and kostovite (CuAuTe₄), have since been reported from many other places around the world. During the 1980s, Bulgarian mineralogists, led by I. Kostov, were involved in a major collaborative program with their Russian colleagues (D.P. Grigoriev, N.Z. Evzikova, and others) aimed at establishing how spatial and temporal changes in crystal morphology were linked to the natural processes of crystal nucleation and growth. The outcome of this program was the recognition of evolutionary trends in crystal habits peculiar to individual mineral bodies, deposits, and ore fields. These ideas were initially reported at the 13th IMA meeting in Varna in 1982.

An essential part of current BMS activities is the publication of *Geochemistry, Mineralogy and Petrology* (ISSN 0324–1718), which in 1975 succeeded the *Bulletin of the Geological Institute, Series Geochemistry, Mineralogy and Petrography*. It is a nonperiodic journal, which is distributed in some 30 countries by the library exchange department of the Bulgarian Academy of Sciences.

BULGARIA'S HERITAGE

Besides the two national museums mentioned above, both universities and research institutes house mineral collections representing Bulgarian and foreign localities. Thanks to the discovery of emeralds (Fig. 4) and other rare minerals, the Urdini Ezero site in the Rila Mountains was declared a national mineralogical reserve in 1984. Because Bulgaria is richly endowed in prehistoric and historic cultural heritage, a large volume of recent publications and other forms of research activity have focused on archaeometry, archaeometallurgy, and related fields. Some of the noteworthy examples include the Neolithic Balkan nephrite culture, some of Europe's oldest copper mines (near Stara Zagora), the prehistoric salt works at Provadla-Solnitsata (from six millennia ago), the world's oldest gold treasure in the Varna Necropolis, plus gold- and graphite-decorated pottery and other artifacts from a variety of prehistoric sites. Do not miss your opportunity to see Bulgaria's mineral heritage and its extraordinary history. We look forward to seeing you at MM9!



FIGURE 4 Beryl (emerald) from the Urdini Lakes area of the Rila Mountains.

Ruslan I. Kostov (rikostov@yahoo.com)
Rossitsa Vassileva (rosivasi0@yahoo.com)



International Mineralogical Association

www.ima-mineralogy.org

2020 IMA MEDAL FOR EXCELLENCE TO GEORGES CALAS

The International Mineralogical Association (IMA) is delighted to present its 2020 IMA Medal for Excellence in Mineralogical Research to Georges Calas, Professor Emeritus at the Institute of Mineralogy, Materials Physics and Cosmochemistry, Sorbonne University (Paris, France) and Honorary Member of the University Institute of France. Georges has been praised as "a luminary of our generation across a wide range of activities of relevance to the IMA", "an intellectual pioneer" and "an ambassador for the mineral sciences worldwide". His work spans a wide range of Earth materials, experimental techniques and theoretical approaches to tackle such challenging problems as the stereochemistry of disordered materials, the structure and properties of melts, and radiation damage in crystals and glasses. Georges' trailblazing research has integrated mineralogy, geochemistry and state-of-the-art spectroscopic and diffraction techniques to promote and set future trends in the areas of environmental geochemistry, structure of materials, trace-element chemistry of minerals and glasses, and nuclear waste management. Most of his work focused on materials that are highly disordered and, thus, extremely difficult to characterize at the atomic level, which is why there was little understanding of their structure and properties prior to his work. George's recent appointment to the technical committee charged with the restoration of fire-damaged windows of Cathédrale Notre-Dame de Paris is a measure of his expertise on glass. He had the foresight to recognize the scientific, societal and environmental importance of these classes of materials and had the insight to develop new approaches to their analysis. In the early 1980s, he was one of the first among European scientists to utilize synchrotron radiation to study minerals and has since become a leading international expert in the applications of these methods to Earth materials of all levels of complexity. With more than 15,000 citations, his published record includes over 310 peer-reviewed contributions, 45 of which have been cited more than 100 times!

The impact and breadth of Professor Calas' contributions to mineral sciences is well illustrated by his contributions to eight (!) different thematic issues of *Elements*: on user research facilities (Brown et al. 2006), arsenic (Morin and Calas 2006), glasses and melts (Calas et al. 2006; Henderson et al. 2006), kaolin (Balan et al. 2014), societal and economic impact of geochemistry (Calas et al. 2015), and mineral resources and sustainability (Calas 2017; Brown et al. 2017). In addition to serving as Principal Editor of *Elements* (2011–2013), Georges guest-edited two special issues of the magazine (2006, 2017) and was involved in various editorial capacities in ten other periodicals. The importance of his research on the behaviour of various geomaterials in the surficial environment (particularly those that are poorly or non-crystalline but geochemically active), on their interaction with organic and biological components, and on various types of contaminants in groundwater and soil is impossible to overemphasize, particularly in light of the recent problems with drinking-water contamination, nuclear waste disposal, and environmentally responsible resource extraction at various sites around the globe. Georges has also been very active in educating the Earth science community about the significance and efficacy of spectroscopic techniques in a wide variety of applications. Throughout his career, he has received numerous awards and recognitions, including fellowships of the Mineralogical Society of America (1989), European Association of Geochemistry and Geochemical Society (2009), Society of Glass Technology (2010), American Ceramic Society (2020), an Honorary Fellowship of the Mineralogical Society of Great Britain and Ireland (2018), Léon Bertrand Prize from the French Geological Society (2006), Dolomieu Grand Prize from the French Academy of Sciences (2014), Merit Award from the French Mineralogical Society (2020),



and a Schlumberger Medal from the Mineralogical Society of Great Britain and Ireland (2011). In addition to his invited professorships at Stanford University (California, USA) and the Collège de France, he was elected a member of Academia Europaea (2011) and the Royal Society of Canada (2014).

We congratulate Professor Calas on his 2020 IMA Medal for Excellence in Mineralogical Research and look forward to reading about his new exciting discoveries in the Notre Dame glasses and beyond!

REFERENCES

- Balan E, Calas G, Bish DL (2014) Kaolin-group minerals: from hydrogen-bonded layers to environmental recorders. *Elements* 10: 183–188
- Brown Jr GE, Calas G, Hemley RJ (2006) Scientific advances made possible by user facilities. *Elements* 2: 23–30
- Brown Jr GE, Hochella Jr MF, Calas G (2017) Improving mitigation of the long-term legacy of mining activities: nano- and molecular-level concepts and methods. *Elements* 13: 325–330
- Calas G (2017) Mineral resources and sustainable development. *Elements* 13: 301–306
- Calas G, Henderson GS, Stebbins JF (2006) Glasses and melts: linking geochemistry and materials science. *Elements* 2: 265–268
- Calas G, MacMillan PE, Bernier-Latmani R (2015) Environmental mineralogy: new challenges, new materials. *Elements* 11: 247–252
- Henderson GS, Calas G, Stebbins JF (2006) The structure of silicate glasses and melts. *Elements* 2: 269–273
- Morin G, Calas G (2006) Arsenic in soils, mine tailings, and former industrial sites. *Elements* 2: 97–101

MINERAL OF THE YEAR 2019

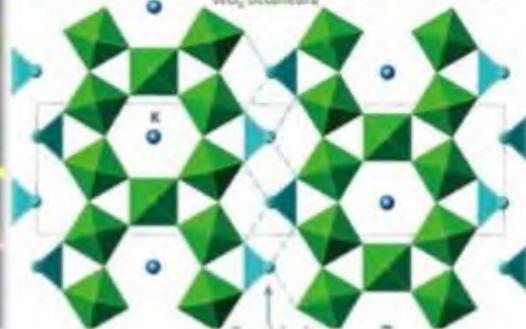
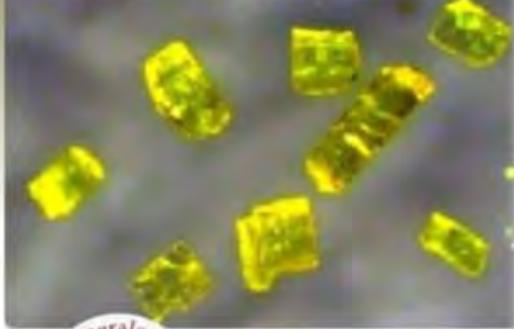
In 2019, the prestigious title went to **tewite**, which has an unusual crystal structure related to that of tungsten bronzes (Li et al., 2019). The new mineral was discovered near Nanyang village in the Panzhihua–Xichang region of China and named for the presence of major tellurium and tungsten in its chemical composition: $(K_{1.61}Na_{0.06}\square_{0.33})(Te_{1.06}W_{0.35}\square_{0.59})W_5O_{19}$. It occurs in lightly weathered biotite–quartz monzonite near its contact with gabbro, and is associated with feldspars, biotite, hornblende, ilmenite, zircon, zoisite, tourmaline, monazite-(Ce), allanite-(Ce), scheelite and tellurite. Notably, tewite developed after another mineral related to tungsten bronzes and approved recently under the name wumuite, $KAl_{0.33}W_{2.67}O_9$ (Xue et al. 2020). The structure of tewite derives from tungsten bronzes, but, unlike the latter, contains ribbons of corner-sharing WO_6 octahedra separated by highly distorted TeO_6 polyhedra. Like in true tungsten bronzes, K occupies hexagonal channels within an octahedral framework in the tewite structure. We would like to congratulate Guowu Li, Yuan Xue and Ming Xiong on this award and encourage everyone to read about their discoveries in the *European Journal of Mineralogy*.

The IMA Commission on New Minerals, Nomenclature and Classification would also like to acknowledge two close runners-ups: rudabanyaite, a new chloroarsenate with $[Ag_2I]_{22}^{4+}$ cluster cations, discovered by Ilerta Effenberger and her coauthors (2019) at the Rudabánya ore deposit (Hungary), and davidbrownite-(NH₄), a new phosphate-oxalate phase from the Rowley mine in Arizona (USA), described by Anthony R. Kampf and colleagues (2019).

REFERENCES

- Li G, Xue Y, Xiong M (2019) Tewite: a K–Te–W new mineral species with a modified tungsten-bronze type structure, from the Panzhihua–Xichang region, southwest China. *European Journal of Mineralogy* 31: 145–152
- Effenberger I, Szakáll S, Fehér B, Váczi T, Zajzon N (2019) Rudabányaite, a new mineral with a $[Ag_2I]_{22}^{4+}$ cluster cation from the Rudabánya ore deposit (Hungary). *European Journal of Mineralogy* 31: 537–547
- Kampf AR and 5 coauthors (2019) Davidbrownite-(NH₄), $(NH_4)K_5(V^{5+}O)_2(C_2O_4)[PO_2(OH)]_{23}14 \cdot 3H_2O$, a new phosphate-oxalate mineral from the Rowley mine, Arizona, USA. *Mineralogical Magazine* 83: 869–877
- Xue Y, Li G, Xie Y (2020) Wumuite ($KAl_{0.33}W_{2.67}O_9$) – a new mineral with an HTB-type structure from the Panzhihua–Xichang region in China. *European Journal of Mineralogy* 32: 483–494

TEWITE: Mineral of the Year 2019



International Mineralogical Association

@InternationalMineralogicalAssociation · Nonprofit Organization

Send Message

Home About Events Photos More

Liked



About

See All

Founded in 1958, the IMA is the world's largest organization promoting mineralogy, one of the oldest of natural sciences.

2,342 people like this including 40 of your friends



2,614 people follow this

<http://www.ima-mineralogy.org/about.htm>

Send Message

anton.chakhmouradian@umanitoba.ca

Nonprofit Organization

Suggest Edits

Does this Page have a phone number?

Yes

Unsure

No

Photos

See All



Create Post

Photo/Video

Check In

Tag Friends



International Mineralogical Association

May 18 at 5:11 PM

On the Rocks 2021 - the first ever Geological Film Festival!
A joint initiative of the Italian Geological Society (SGI), Italian Society for Mineralogy and Petrology (SIMP), and Italian Paleontological Society (SPI). On the Rocks 2021 is the first geological film festival for everybody. If you are interested in participating, enter a creative video, which represents your research, passions or new ideas regarding the Earth, in no more than 4 minutes and 55 seconds!

Challenge... See More



On the Rocks

TV/Movie Award

Liked

7

6 REPORT OF THE IMA MEDAL COMMITTEE



**COLLEGE OF
LIBERAL ARTS & SCIENCES**
**Department of Earth &
Environmental Sciences**
115 Trowbridge Hall
Iowa City, Iowa 52242-1379
319-335-1818 Fax 319-335-1821

May 22, 2020

Prof. Patrick Cordier
President, International Mineralogical Association
Unité Matériaux et Transformations
Université de Lille
59655 Villeneuve d'Ascq, France

Dear Patrick and members of IMA Council,

Enclosed please find the **Report of the IMA Medal of Excellence Committee** and their recommendation for the 2020 award. The current committee members are Tomasz Bajda (Poland), Joël Brugger (Australia), Maria Luce Frezzotti (Italy), Jane Gilotti, Chair (USA), Shun Karato (USA), Sergey Krivovichev (Russia), Falko Langenhorst (Germany), Daniela Rubatto (Switzerland) and Tatsuki Tsujimori (Japan). Jana Kotková (Czech Republic) and Allan Pring (Australia) just stepped off the committee, while Badja and Brugger joined this year for four-year terms.

The Committee considered five nominations for the 2020 IMA Medal:

- 1) Georges Calas, France nominated by Frank Hawthorne
 - 2) Robert Hazen, USA nominated by Edward Grew
 - 3) Roger H. Mitchell, Canada nominated by Anton Chakhmouradian
 - 4) Jan Srodon, Poland nominated by Ewa Slaby (Min. Soc. Polish Academy of Sciences)
 - 5) Igor Villa, Italy nominated by John Hanchar
- Srodon and Villa are new nominations, while Calas and Hazen are repeat nominations from last year. Mitchell was nominated for a fourth time.

The Committee recommends that the **2020 IMA Medal of Excellence** go to **Prof. Georges Calas** for his outstanding contributions to our understanding of disordered materials by the development and application of novel spectroscopic techniques. Calas is a world leader in the study of the structure and properties of glasses, the weathering of layered silicates, the behavior of transition elements and arsenic, and the application of spectroscopic methods to characterize crystalline and poorly crystalline substances. He has done pioneering work on nuclear waste disposal and tailings remediation by developing a fundamental understanding of fluid – rock interactions. His prolific publication and citation records are a strong indicator of the broad impact of his work. The supporting material for the nomination of Prof. Calas is attached to this email as a pdf.

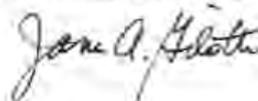
The Committee had to make a choice from a very well qualified field of five candidates that in the end came down to two nominees: Georges Calas and Robert Hazen, whose publication metrics are nearly identical. A majority of our members (6 out of 8) support Calas as the

recipient of the 2020 Award, but two other members feel strongly that the award should go to Hazan. As Chair of the committee, I did not participate in the vote, but rather tried to facilitate a discussion leading to a result that the whole committee could support. We did not formally rank the other candidates, as it was clear from the outset that the decision would be between Calas and Hazan. All members felt that this was a very difficult choice, but the majority argued that Calas had the stronger scientific record. The committee was happy to see that the increase in the number of nominations to five last year was sustained in 2020 and up from previous years (e.g. 2 in 2011, 3 in 2013, 1 in 2015, 2 in 2017, 2 in 2018 and 5 in 2019). The committee was also pleased by the quality of the nominations. We encourage Councilors and officers of IMA to continue their efforts to help us solicit nominations.

There are a couple of additional business items related to the IMA Medal Committee that Council needs to address. I will step down as Chair of the IMA Medal Committee (after two terms) and as an IMA Councilor at the end of 2020. Daniella Rubatto, whose term on the committee also ends this year, has informally agreed to step up as Chair of the Medal Committee, with the approval of Council. I highly recommend Rubatto for this job because she understands how the committee works, is very organized and is a strong leader. Before I step down, I will revise the Medal Committee handbook to include some of the new procedures for the committee, as well as the timetable. I would like to thank Council for deciding that a nomination may be revised and resubmitted four times, for a total of 5 tries.

It has been a pleasure to serve as the Chair of the Medal Committee and to proffer our recommendation for the 2020 Medal.

Respectfully submitted,



Jane A. Gilotti, Professor
Chair, IMA Medal of Excellence Committee

Addendum to the REPORT OF THE IMA MEDAL COMMITTEE



COLLEGE OF
LIBERAL ARTS & SCIENCES
Department of Earth &
Environmental Sciences
115 Trowbridge Hall
Iowa City, Iowa 52242-1185
319-335-1410 FAX 319-335-1861

January 10, 2021

Prof. Patrick Cordier
President, International Mineralogical Association
Unité Matériaux et Transformations
Université de Lille
59655 Villeneuve d'Ascq, France

Dear Patrick and members of IMA Council,

This is an **ADDENDUM** to the original **Report of the IMA Medal Committee** submitted on May 22, 2020. The purpose is to update Council on the transition to the 2021 Committee. My term as Chair ended in December 2020. I have provided the incoming Chair, Prof. Daniela Rubatto, University of Bern, Switzerland with a revised handbook, a list of all past committee members and their service terms, and a list of all the past nominees and winners of the IMA Medal of Excellence. Rubatto already has the nomination material from the past 3 years from serving as a member of the committee and, of course, I will be available to help her with any questions.

The main change to the IMA Medal during my 6 year tenure as Chair was the switch to an annual award in 2018. I think this was a good thing and it seems the mineralogical community is happy with it as well. In 2019, we saw an increase to a total of 5 nominees up from 1-3 in previous years, and this was repeated in 2020. We should aim to sustain or exceed this level of nominations. Council should play an active role in soliciting nominations. The decision of Council to allow for a nomination to be submitted a total of five times should help keep the numbers up.

Finally, the website for the IMA Medal needs to be updated. In particular, the pages for present and former committee members are out-of-date. A statement needs to be added to the Submitting Nominations page that clarifies a nomination may be revised and resubmitted four times for a total of five years. This is a minor issue but should be fixed as soon as possible because I am already receiving inquiries about the Medal process that should be going to Rubatto.

It has been a real pleasure to serve as a member and Chair of the IMA Medal Committee, as well as a member of Council.

Respectfully submitted,

A handwritten signature in black ink that reads "Jane A. Gilotti".

Jane A. Gilotti, Professor
Chair, IMA Medal of Excellence Committee

7 NOMINATIONS OF COUNCIL MEMBERS

As stipulated by the IMA statutes, the Council proposed the following Slate of Nominees for election or re-election:

President	Anhuai Lu (<2022)	(no need to vote for)
Past President	Patrick Cordier (<2022)	(no need to vote for)
1 st Vice President	Hans-Peter Schertl (<2022)	(new 1st Vice President, need to vote for)
2 nd Vice President	Razvan Caracas (<2022)	(no need to vote for)
Secretary	Sylvie Demouchy (<2024)	(new Secretary, need to vote for)
Treasurer	Travis Olds (<2024)	(no need to vote for)
Communication Officer	Anton Chakmouradian (<2022)	(no need to vote for)

Councillors:

Ross J. Angel (<2024)	(new Councillor, need to vote for)
Hiroaki Ohfuji (2024)	(new Councillor, need to vote for)
Catherine McCammon (<2024)	(re-election, need to vote for)
Marco Pasero (<2022)	(no need to vote for)
Sergey Smirnov (<2022)	(no need to vote for)

The secretary did not receive any additional nominations.

The President thanked Jane Gilotti and Mark Welch for their work as outgoing Council Members. He explained the type of voting; the country representatives have 12 hours time to submit their votes. Because of the Corona problems the former President Sergey Krivovichev and a colleague of his choice offered to act as the Balloting Committee. The results will be presented at the 2nd Business Meeting.

8 POTENTIAL CHANGES OF OFFICERS FOR COMMISSIONS

There are some changes expected later this year but at this point (January 11, 2021) there was nothing to decide.

9 ESTABLISHMENT OF NEW COMMISSIONS AND WORKING GROUPS

The President proposed to establish a Working Group on the Year of Mineralogy. He reported that already a few colleagues like Georges Calas, Sergey Krivovichev, Eiji Ohtani and Michele Zema already showed their interest to attend this group. He invites further people to attend the group.

10 REPORT OF THE IMA ARCHIVE

I would like to give a short summary about the IMA archive activities during the last two years with an outlook to the future.

After the 22nd IMA General Meeting (Melbourne), we have collected some IMA documents and pictures from our colleagues and professors from different universities in Hungary. IMA GM's abstract books have been collected, digitized and uploaded to the IMA website (<https://www.ima-mineralogy.org/Archives.htm>). So the mentioned documents that are related to former Business and Council Meetings and come for example from Professor Sztrókay's heritage. We have transported them to the Hungarian Natural History Museum. Thereafter, we have scanned and digitized these documents, and in the next step we will upload it to the IMA website. I will contact Wolfgang Zirbs about it soon.

In 2020 the original plan was that I and my colleagues from the HNHM will spend some time in Bulgaria participating in the 9th International Conference on Mineralogy and Museums and besides we start to process the IMA documents with the help of Prof. Ruslan Kostov. 2020 was a hard and difficult year because of the coronavirus pandemic situation, so we couldn't travel to Bulgaria. Therefore we have continued the collection of Hungarian documents related to IMA. We hope that 2021 will be better than 2020.

The main future plan is that I will travel to Bulgaria and I will take a part in the 9th International Conference on Mineralogy and Museums between 24-26 August 2021 and - besides my attendance of the meeting - with the help of Ruslan I will process and review the IMA documents (related to IMA GM, BM, CM and pictures). I think that the personal discussion about the IMA documents is an important and necessary point because there are many important details related to them which are only known by Ruslan. If we can preserve these essential additions with the documents during the digitization process (uploading, inventorization and investigation) we can inherit useful information and memories for the future generations. In that case, if I can not travel to Bulgaria, then I will ask for help related to the transportation of these documents from Bulgaria to Hungary. But this solution is not the best because of the lack of personal discussion. So I hope that the pandemic situation will be handled in the next few months.

In the future we have three main tasks. After Bulgaria, we will continue the collection of IMA documents around the world. Prof. Peter Burns and Travis Olds have indicated that there are a lot of documents related to the IMA, that they would like to deliver to the IMA Archive. After that we will get some documents from the NHM from Australia, what we have to transport to the IMA Archive and we have to process it.

So the work is continuous and we will do our best for the success of the enlargement of the IMA Archive. And finally, I would like to ask that please join to the membership of the Subcommittee to help us preserve the past, the tradition and the heritage of IMA. And If You have any documents or information that you can share with the IMA Archive, then please write me an email at annamaria.kis@gmail.com. I will do my best so that we can contact you as soon as possible and the documents can reach the IMA Archive.

The technical place of the IMA Archive – where the documents are collected – is the HNHM in Budapest.

Annamaria Kis, January 11, 2021

11 FUTURE GENERAL MEETINGS

IMA – 2022 (LYON, FRANCE)
IMA – 2026

Razvan Caracas gave a short information on IMA 2022. He mentioned that the website (www.ima2022.fr) is open to submit scientific sessions and field trips and expressed his hope that this meeting is no longer affected by Corona problems and to meet face to face in Lyon.

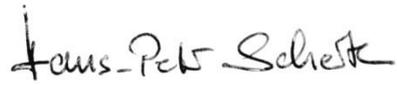
With respect to IMA – 2026 General Meeting Anton Chakhmouradian offered to undertake the task to contact colleagues in Seoul, South Korea to act as a possible host. In addition 1st Vice President Anhuai Lu reported that also Nanjing, China is interested to submit a proposal related to IMA – 2026.

12 OTHER BUSINESS

There was nothing to discuss under this point.

The President thanked all contributors and participants; the 1st Business Meeting meeting was closed at 3:30 p.m.

June 14, 2021

Handwritten signature of Hans-Peter Schertl in black ink.

(Hans-Peter Schertl, Secretary)

Handwritten signature of Patrick Cordier in black ink, featuring a stylized, overlapping 'C' and 'D'.

(Patrick Cordier, President)