International Mineralogical Association

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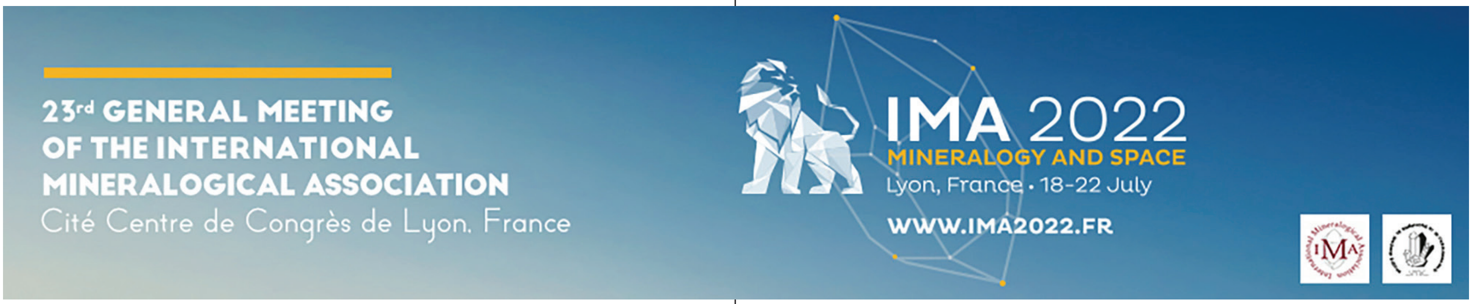

Following the tradition of quadrennial general meetings of the International Mineralogical Association (IMA) organized by national societies, the French Society for Mineralogy and Crystallography will host the 23rd General Meeting of the IMA in Lyon, France during 18–22 July 2022.

2022 is the year to celebrate mineralogy. It marks the bicentennial of the death of René Just Haüy (born 1743), who is the father of modern mineralogy and crystallography. Two centuries ago, Haüy published his seminal works *Traité de minéralogy* and *Traité de cristallographie*. Fast-forward to 2022, the two most recent Mars exploration programs, *Perseverance* (Mars2020) and *Huoxing 1*, are flooding us with amazing data and remarkable results. With the return of a sample capsule from *Hayabusa2*, fragments of a primitive carbonaceous asteroid have now been analysed for the first time.

The 23rd Meeting of the IMA will celebrate these momentous occasions. We, the organizers, would like to paint IMA 2022 with the colours of space exploration. Alongside the more traditional mineralogists, we want to inspire the emerging next generation of scientists and take a step closer toward the final frontier. The meeting will bring together all the new facets of modern mineralogy. It will be a playground, where traditional research rooted in Haüy's careful experiments with rocks and crystals will meet planetary exploration of the 21st century, and it will be the place to celebrate two centuries of mineral sciences.

This General Meeting will offer stimulating plenary lectures by the world's leading scholars, society events, short courses, award ceremonies, presentations from funding agencies, national business meetings, and about 60 scientific sessions grouped under several overarching themes:

- T1 – Extraterrestrial mineralogy
- T2 – Planetary interiors
- T3 – Mineral systematics, gems, collections
- T4 – The dynamic world of minerals
- T5 – Environmental mineralogy and biomineralogy
- T6 – Applied, ore, and industrial mineralogy
- T7 – Mineralogy and petrology

With such a diversified technical program, everyone will be sure to find a session in their area of expertise, or venture outside their familiar territory to learn about new discoveries, techniques, and ideas of modern mineralogy. Particular emphasis will be placed on societal issues by facilitating discussions, cross-field symposia, and sessions to address the current challenges in ore and raw materials supply, energy and environmental sustainability, health, and cultural heritage.

Lyon is well known for its remarkable historical and architectural landmarks that earned it the status of UNESCO World Heritage Site. The city was recognized as an important area for the production and weaving of silk from the late 1400s and through the Industrial Revolution. Unsurprisingly, the first programmable loom was invented here by the Lyonnaise weaver Jean Marie Charles – two centuries ago, as well! It is also the city, where Auguste and Louis Lumière invented the cinematograph at the end of the 1880s. Today, Lyon is a major hub for the chemical, pharmaceutical, and biotech industries. And let's not forget its reputation as the gastronomic capital of France (some even say the world)! In the heart of Europe, this city can be easily reached from anywhere in the world, and serves as a gateway to Languedoc, Dauphiné, Burgundy, and the Western Alps with the iconic Mont Blanc. The venue is the Lyon Convention Centre, an impressive state-of-the-art facility featuring 25,000 m² of innovative interior architecture and situated between the Rhône River and Tête d'Or Park. The venue is ideally situated close to the historic center and public transportation routes.

To stay updated, please regularly visit the official conference website (https://ima2022.fr) and follow us on Facebook (https://www.facebook.com/IMA2022/) and Twitter (@CongressIma).

We look forward to seeing you in France this summer!

Mineralogy is one of the oldest branches of science, and it has played a key role in the deciphering of the structure of matter and in the development of science and technology. To commemorate the bicentennial of the death of René Just Haüy, the International Mineralogical Association declared 2022 the YEAR OF MINERALOGY.

MINERALOGY 2022

IYBSSD2022 International Year of Basic Sciences for Sustainable Development

Mineralogy 2022 is a global initiative intended to highlight the importance of mineral sciences in our everyday lives. Mineralogy 2022 will consist of coordinated activities on the regional, national, and international levels. These activities will underscore the significance of mineralogy as a basic science. As such, all Mineralogy 2022 activities will take place under the patronage of the International Year of Basic Science for Sustainable Development declared by UNESCO (https://www.iybssd2022.org/en/).

While the Year of Mineralogy 2022 will be launched during the 23rd General Meeting in Lyon, outreach, promotional, and other activities are already in full swing and will continue beyond July 2022.

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2022 IMA MEDAL OF EXCELLENCE TO PATRICIA M. DOVE

The IMA is delighted to present its 2022 Medal of Excellence to Patricia M. Dove, Distinguished Professor and C.P. Miles Professor of Science at Virginia Polytechnic Institute and State University, USA. She has been praised as a "world leader in the field of mineral reactivity and biomineralogy" and a pioneer who "has combined key advances and development of new techniques at the atomic level with major insight into large scale processes including the long-term evolution of biomineral systems."

Patricia completed her BSc. and M.Sc. studies at Virginia Tech, USA (1981 and 1984, respectively) and earned her doctoral degree from Princeton, USA, in 1991. In the past 30 years, she has built an impressively successful research career at the crossroads of mineralogy, aqueous geochemistry, biochemistry, surface physics, and environmental science—first at Georgia Tech and since 2000 at Virginia Tech. Recognizing the critical role of interaction between rocks and biota in the critical zone, Professor Dove embarked on studying some of the least-understood aspects of that interaction, including the atomic-scale kinetics and molecular dynamics of dissolution and precipitation at mineral surfaces, and focused her research efforts on biologically relevant systems (quartz, amorphous silica, calcite, and amorphous $CaCO_3$). She pioneered the use of atomic force microscopy (AFM) for in-situ molecular imaging to observe crystal growth and resorption under carefully controlled conditions (Dove and Hochella 1993; Dove and Platt 1996). The parameters of these experiments ranged from ambient temperature and pressure to methodologically challenging simulated environments, which required ingenious experimental apparatus, such as a hydrothermal mixed-flow reactor for direct measurements of reaction rates at steady-state conditions (Dove and Crerar 1990) and fluid-tapping AFM for studying microbial interactions with minerals (Grantham and Dove 1996). This work was foundational to constraining the effects of physico-chemical parameters on the kinetics of crystal growth and dissolution, and to the development of quantitative molecular models describing these processes in surficial, hydrothermal and bio-mediated environments (e.g., Dove, 2010; Dove et al., 2008, 2019). Another important outcome of Professor Dove's research was the collaborative discovery of crystallization by particle attachment (De Yoreo et al. 2015). This "non-classical" crystallization mechanism has since been documented increasingly in synthetic and natural systems, yielding over 170 citations of the original publication annually! These papers have far-reaching implications, not only for our understanding of how minerals form and dissolve but also for the interpretation of rock textures, paleoclimate reconstructions, evolutionary biology, and such practically important areas as nanotechnology and crystal design. Professor Dove's outstanding contribution to science has been recognized through many awards and honors, including the F.W. Clarke Medal from the Geochemical Society (1996); Dana Medal from the Mineralogical Society of America (2014); fellowships with the Mineralogical Society of America (2000), American Geophysical Union (2008), and Geochemical Society (2010); and the US Department of Energy Best University Research Award (1999 and 2005).

Professor Dove is an award-winning educator and promoter of science, who has shared her passion for biomineralogy with hundreds of university and school students through the National Science Foundation programs, Virginia Tech's CurVinci Living Learning Communities, Kids Tech, and other outreach platforms. At Georgia and Virginia Techs, she has developed and taught an impressive spectrum of courses, from *Resources of the Earth* to *Oceanography* and *Biomimetic Materials and Design*.

We congratulate Professor Dove on this prestigious award and look forward to reading about her new exciting discoveries in biomineralogy and beyond!

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MINERAL OF THE YEAR AWARD

The IMA is pleased to announce that for 2021, the "Mineral of the Year" award has been assigned to **seaborgite**. The mineral was found and fully characterized by a research team led by Anthony R. Kampf, from the Mineral Sciences Department of the Natural History Museum of Los Angeles County, Los Angeles, California, USA (Kampf et al., 2021).

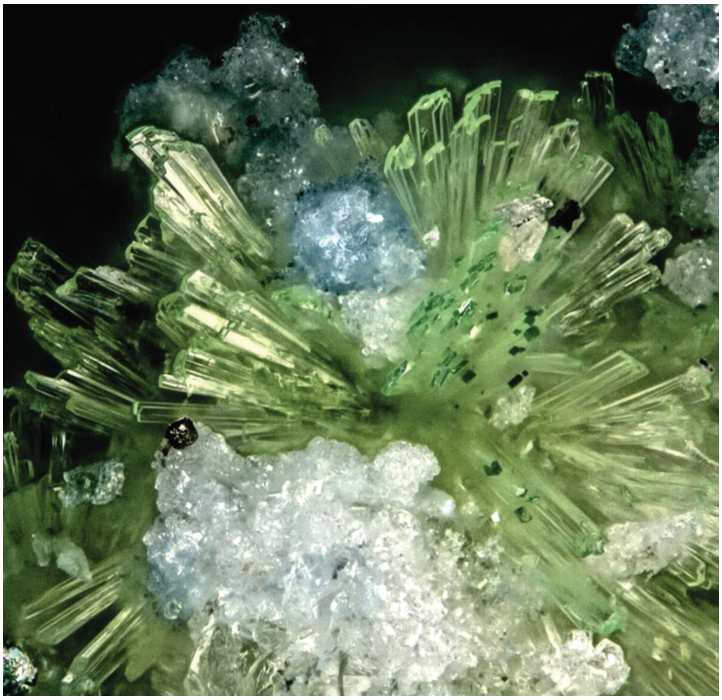

FIGURE 1 Diverging group of bladed seaborgite crystals (associated with ferrinatrite)

Seaborgite was found in the Blue Lizard mine, Red Canyon, White Canyon District, San Juan Co., Utah, USA, where it occurs on a thick crust of gypsum overlaying a matrix comprising mostly quartz. Associated phases are copiapite, ferrinatrite, ivsite, metavoltine, römerite, and other currently unknown minerals. Seaborgite occurs as attractive bladed crystals of light-yellow color up to 0.2 mm in length. Crystals typically occur in radiating sprays (Fig. 1). The ideal chemical formula of seaborgite is $LiNa_6K_2(UO_2)(SO_4)_5(SO_3OH)(H_2O)$; hence, it is an uranyl sulfate mineral. Seaborgite is the only known mineral species containing both Li and U as species-forming elements, and it is also one of very few minerals containing three distinct alkali metals.

Seaborgite is triclinic, with space group $P\bar{1}$, and unit cell parameters a = 5.4511(4) Å, b = 14.4870(12) Å, c = 15.8735(15) Å, α = 76.295(5)°, β = 81.439(6)°, and γ = 85.511(6)°. Its crystal structure has been determined by single-crystal X-ray diffraction methods to R = 3.77%. The structure of seaborgite is new and unprecedented, although it is based on the same uranyl sulfate cluster that is topologically identical to the one in the crystal structure of bluelizardite.

The mineral was named after Glenn Seaborg (1912–1999), an American chemist who was involved in the synthesis, discovery, and investigation of ten transuranium elements, including seaborgium. These studies led him to win the 1951 Nobel Prize in Chemistry.

Seaborgite is the third "Mineral of the Year" with its type locality in the USA. The previous winners were ophirite (2014, from the Ophir mine in Utah) and rowleyite (2017, from the Rowley mine in Arizona). The Blue Lizard mine was a prolific mineralogical site and the type locality for 22 other mineral species besides seaborgite.

The full description of the new mineral is available courtesy of the American Mineralogist from https://pubs.geoscienceworld.org/msa/ammin/article/106/1/105/593632/Seaborgite-LiNa6K2-UO2-SO4-5-SO3OH-H2O-the-First?guestAccessKey=195c8c0d-8405-407e-8990-0f002e75bade

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International Association of GeoChemistry

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APPLIED GEOCHEMISTRY EXCELLENCE IN REVIEW AWARDS

Since the founding of *Applied Geochemistry* in 1986, many outstanding reviewers have helped shape our Society's journal and our success as a Society. We are indebted to those contributions, and starting last year, we began highlighting the reviewers who deserve extra recognition. The editorial board of *Applied Geochemistry* launched our annual "Excellence in Review Award" to recognize the dedicated community of expert reviewers inside and outside of our organization. We offer a big THANK YOU to all our awardees, and congratulations!

Marc Aertsens – Institute for Environment, Health and Safety, Belgian Nuclear Research Centre, Belgium

Maria Isabel Arce – Center for Edaphology and Applied Biology of Segura, Spanish National Research Council, Spain

Marie-Laure Bagard – Department of Earth Science, University of Cambridge, UK

Christophe Cloquet – Centre de recherches pétrographiques et géochimiques (CRPG), French National Centre for Scientific Research, France

David Ronald Cohen – School of Biological, Earth and Environmental Sciences, University of South New Wales, Australia

Xavier Gaona – Institute for Nuclear Waste Disposal (INE), Karlsruhe Institute of Technology, Germany

Andrew Hursthouse – School of Computing, Engineering and Physical Sciences, Centre for Environmental Research, Institute for Biomedical and Environmental Health Research, University of the West of Scotland, UK

Siliang Li – Institute of Surface-Earth System Science, Tianjin University, China

Haiyan Liu – School of Water Resources and Environmental Engineering, East China University of Technology, China

Jenna Luek – Department of Civil and Environmental Engineering, University of New Hampshire, USA

Juraj Majzlan – Institute of Geosciences, Mineralogy, Friedrich Schiller University Jena, Germany

Shinya Nagasaki – Department of Engineering Physics, McMaster University, Canada

Jean-Philippe Nicot – Jackson School of Geosciences, University of Texas at Austin, USA

Laura Richards – Department of Earth and Environmental Sciences, The University of Manchester, UK

Madeline E. Schreiber – Department of Geosciences, Virginia Polytechnic Institute and State University, USA

David Singer – Department of Geology, Kent State University, USA

Colin Stuart Walker – Nuclear Fuel Cycle Engineering Laboratories, Japan Atomic Energy Agency, Japan

Tao Wen – Department of Earth and Environmental Sciences, Syracuse University Canada, USA

Jun Xiao – Institute of Earth Environment, Chinese Academy of Science, China

Tianfu Xu – College of New Energy and Environment, Jilin University, China

Shouye Yang – School of Ocean and Earth Science, Tongji University, China

LianGe Zheng – Energy Geosciences Division, Lawrence Berkeley National Lab, USA

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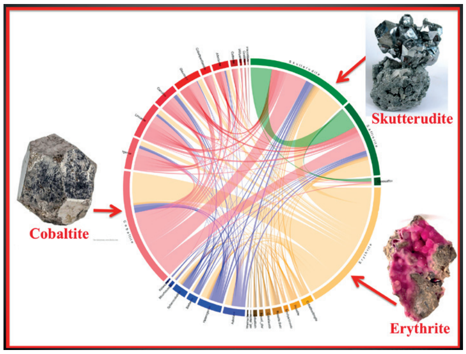
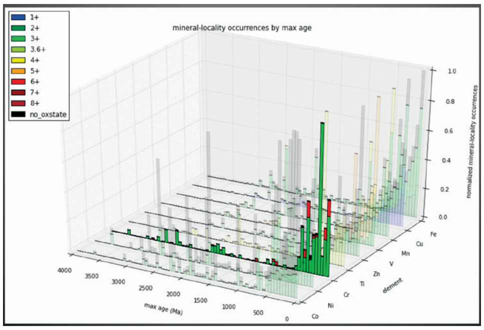
NEWLY ANNOUNCED: THE IMA WORKING GROUP ON MINERAL INFORMATICS

Informatics, or information science, focuses on all aspects of extracting information from data. The objectives of informatics include assembling and providing access to well-curated data resources, developing and applying advanced analytical and visualization methods, and the interpretation of results after applying these methods. Open and reliable data resources that conform to FAIR (Findable, Accessible, Interoperable, and Reusable) practices are an essential pillar of scientific advances through informatics. Mineralogists have long benefitted from open-access data resources such as mindat.org, rruff.info, and earthchem.org, but a significant amount of published and unpublished data on mineral occurrences, compositions, physical properties, and other attributes are not yet available on any open-access platform. Most mineralogical publications do not require new data to be deposited in an open-access form, nor are there uniform standards for reporting such data.

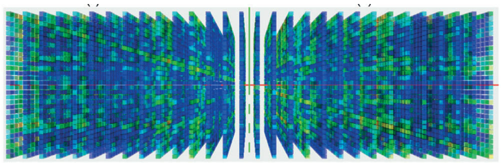


Chord diagram illustrating co-existing pairs of the 30 most abundant cobalt-bearing minerals. These data reveal significant correlations between cobalt and arsenic mineralization.

Accordingly, significant opportunities exist to improve the accessibility and reliability of a wide range of mineralogical data, as well as to develop and disseminate analytical and visualization methods to advance mineralogical research. We hope to start a conversation among engaged members of the community to identify needs and opportunities, to formulate best practices, to encourage a culture of data sharing among members of the Earth and planetary materials community, and to develop and share new resources.

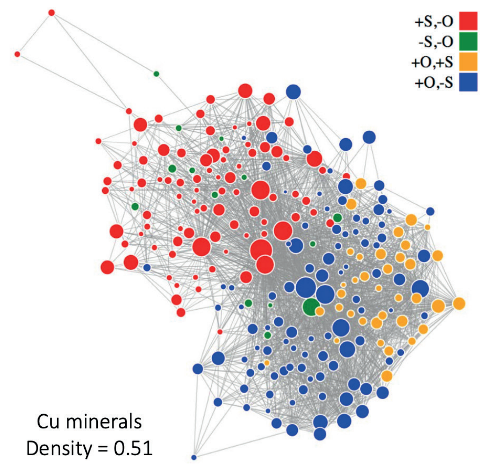


"Skyline diagram" of the temporal distribution of minerals containing 10 first-row transition elements colored according to the oxidation state. These data display episodic mineralization associated with the supercontinent cycle and changes in oxidation states associated with increases in atmospheric oxygenation.

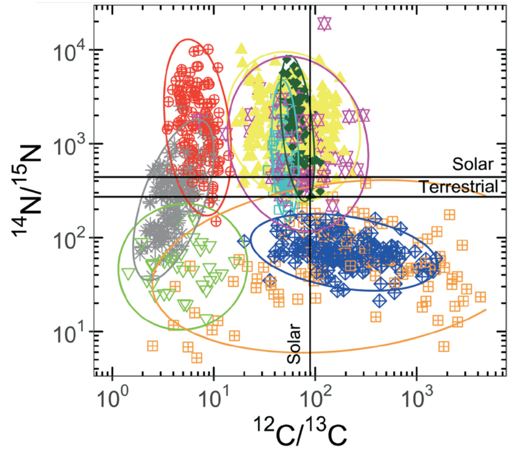


Three-dimensional 30 × 30 × 30 (27,000-matrix-element) Klee diagram revealing the relative abundances of minerals with three different co-existing chemical elements. Brighter colors indicate three-element combinations that are more common than predicted by crustal abundances.

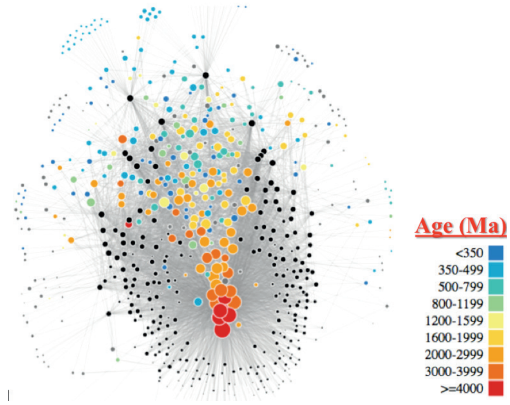
Accordingly, Sergey Krivovichev, Shaunna Morison, Yan Li, and Robert Hazen have been asked to lead a new International Mineralogical Association called the "Mineral Informatics Working Group." As a first step, we are developing a list of interested mineralogical community members. If you would like to receive future notices, and perhaps participate in this effort, please email Robert Hazen at rhazen@ciw.edu.



Network diagram illustrating the co-existence of 243 copper-bearing minerals (each represented by a circle). Sizes indicate relative abundances, while colors are based on mineral chemistry. Embedded in this diagram are gradients of the oxygen and sulfur activity.



Cluster analyses of stellar silicon carbide grains, based on isotope ratios, revealing various types of parent stars, including AGB stars and supernovas.



Bipartite network of carbon-bearing minerals (colored circles, sized according to their abundances) illustrating links to their localities (black circles, sized according to the number of carbon minerals). Colors indicate relative ages, which decrease from the center of the graph to the periphery.