German Mineralogical Society

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FROM THE PRESIDENT

Dear members and friends,

The European mineralogical societies have a history of cooperation and collaborative activities that carried the growth of the European scientific network in our field. Milestones on this road are the foundation of EMU, the European Mineralogical Union, in 1987, and the joint publication of the EJM, the *European Journal of Mineralogy*, in 1989, which went full open access in 2020. The societies also organized the first joint mineralogical meetings in Cambridge 2007 and Edinburgh 2009, which were considered great successes and led to the installation of a regular European mineralogical conference (emc). The mineralogical societies now convene for an emc every four years after the first emc was held in Frankfurt am Main in 2012, followed by Rimini 2016, and Krakow 2021 (with a Covid 19–related delay and online). This year 2024 sees the 4th emc, held in Dublin from 18–23 August on the campus of Trinity College in the Irish capital.

The DMG is a co-host of emc^{2024}, which is also the official annual DMG conference of 2024. The DMG will hold its annual general meeting (AGM) in Dublin on Monday 18 August (18:30 h) and its medal award ceremony on Friday 23 August (16:00 h). All DMG members are cordially invited to attend both of these events, to participate in the AGM, and to honor our deserving medal awardees and price winners.

Unfortunately, this year's Goldschmidt conference of the Geochemical Society in Chicago was scheduled in the very same week that was already taken by emc^{2024} and, thus, creates competition, in particular for the geochemical, cosmochemical, and petrological branches of mineralogy. The emc^{2024} Dublin program does include these disciplines too, but also covers a wide range of other topics, including applied mineralogy, archeometry, mineral physics, crystallography, and biomineralogy. More than 500 abstracts have been accommodated in the program and integrated into a diverse list of talks and posters that I am sure will spark thoughts, discussions, and the exchange of ideas for an inspiring week on the banks of the Liffey. See you all in Dublin!

Yours sincerely,

Horst Marschall

DORIS SCHACHNER MEDAL TO PAUL RUSTEMEYER

The DMG presents the Doris Schachner Medal 2024 to Dr. Paul Rustemeyer in recognition of his services in promoting the prestige and public perception of mineralogy as a scientific discipline. Paul Rustemeyer has been fascinated by the world of minerals since his childhood years and has been giving lectures on mineralogical topics to the general public for decades. In addition to his peer-reviewed publications, he has published several dozen popular-science articles on mineralogical topics, and he serves as the editor of the German mineral-collectors magazine *Der Erzgräber*. He has also published two comprehensive books on the crystal structure of tourmaline, which are accessible to interested laypeople and experts alike, and contain a wealth of newly discovered mineralogical aspects on the internal structure, external morphology, and growth history of the minerals of this supergroup.

Paul Rustemeyer, born in 1952, completed a doctorate in chemistry in 1981 under the supervision of Ernst Otto Fischer on carbene and carbine complexes of rhenium. He then spent his professional life on the research and development of synthetic fibers for a French chemical company until his retirement in 2010. In the 1990s, he became fascinated by the aesthetics of dark tourmaline in thin section. He started to investigate the relationships between the highly diverse structures, the external morphological phenomena, and the genesis of the crystals, and recognized that the colour zones of tourmalines are uniquely suited to making mineralogical phenomena visible and intuitively comprehensible.

From his collection of tourmaline crystals, sections, and photos, he developed the traveling exhibition "Crystal Magic – Fascinating Crystals with Fantastic Inner Worlds." His books and the exhibition are anchored on aesthetic exhibits to create attraction and to offer geoscientific contexts in simple, accessible language. This exhibition is thus perfectly suited to drawing the attention of the general public to the subject of mineralogy and to instill fascination for mineralogy in visitors of all ages and backgrounds.

The exhibition initially focuses on visual stimuli and presents the aesthetics of the minerals, but then carefully and subtly brings a wealth of scientific aspects to the visitor. For example, it deals with nucleation, growth, and resorption, and explains the formation of oscillatory zoning, sector zoning, and pleochroism in a vivid way, making the crystallographic surfaces and directions that make up a crystal tangible. Paul Rustemeyer draws on a huge arsenal of crystal thick and thin sections, all of which he has cut and polished by hand in his private workshop. Some of the tourmaline samples were purchased from dealers, but he has also collected many of them himself on his numerous field trips. The result is a unique collection of thousands of interior views of tourmaline-group crystals, which Paul Rustemeyer has professionally photographed himself and integrated into his exhibition.

The didactic concept of the exhibition invites visitors (young and old) to engage with the topic of crystal growth by playfully interrogating the three-dimensional structure of the crystals. This is done, on the one hand, via audiovisual installations and electronic media, but above all, via 3D puzzles, movable block models, back-lit thin-sections of real crystals, and by guiding the visitor through the exhibition using quizzes and drawings. The exhibition has been on display in 23 different natural history museums in Germany, Austria, and Switzerland since 2007 and has drawn an audience of many thousands of visitors, with displays in the cities of Magdeburg, Dortmund, and Bamberg coming up next.

The German Mineralogical Society honors Dr. Paul Rustemeyer with the Doris Schachner Medal for his services to the public recognition of mineralogy. He has provided a lasting service to promote mineralogy at the junction between professional science, amateur collectors, and the general public.

Horst Marschall (Frankfurt/Main)

VICTOR MORITZ GOLDSCHMIDT PRIZE 2024 TO JOHANNES BUCHEN

Johannes Buchen studied mineralogy at the University of Mainz (Germany) and obtained his PhD in 2018 with distinction at Bayerisches Geoinstitut in Bayreuth (BGI, Germany). From 2018 to 2021, he was postdoc in the seismological laboratory of Caltech (USA), and afterwards postdoctoral research assistant at the University of Oxford (UK). Since 2023, he has been a junior professor at BGI.

Johannes Buchen is a mineral physicist who uses high-pressure experiments in the diamond anvil cell to study the structure and properties of Earth's deep interior. One of his main targets are measurements of

the seismic velocities in mineral assemblages of the deep mantle that may be used for the interpretation of seismic data.

During his PhD thesis, Johannes Buchen investigated whether water may be detected in the transition zone of the mantle using seismic methods. Wadsleyite, a main mineral of the transition zone, may store several weight percent of water in its structure. Water enrichment in the transition zone may therefore perhaps lead to a reduction of seismic wave velocities. Johannes Buchen managed to measure the full elastic tensor of hydrous wadsleyite under high pressure, which by itself is an impressive technological achievement. He showed that in contrast to previous assumptions, water dissolution in wadsleyite has only a minor effect on seismic wave velocities. However, differences in the strength of seismic reflections at the 410-km discontinuity could be used to quantify local water content. This may lead to a much-improved image of the distribution of water in Earth's deep interior. In cooperation with seismologists, Johannes Buchen investigated a range of models for the reflection of seismic waves at the 410-km discontinuity below the North Atlantic. The data could only be explained if a water-rich transition zone is overlain by an iron-rich upper mantle.

Johannes Buchen also studied the effects of chemical composition and mineralogy on seismic wave velocities in the lower mantle, including a new thermodynamic formalism for describing the spin transitions of iron in minerals. He showed that a lower mantle with peridotitic composition would lead to shear wave velocities that are higher than those observed. Possibly, the lower mantle contains Si-rich and Fe-poor regions that were produced by the crystallization of a magma ocean.

Hans Keppler (Bayerisches Geoinstitut, Bayreuth)

BEATE-MOCEK PRIZE 2024 TO JIE XU

In its 11th year, the DMG awards the Beate-Mocek Prize for the promotion of female scientific talents in the field of mineralogy, petrology, and geochemistry, named after the recognized petrologist and geochemist Beate Mocek.

This year, Jie Xu (Goethe University Frankfurt, Germany), who has been writing her dissertation on boron isotope fractionation in subduction zones since October 2020, receives this award. Since her master's studies in Beijing (China), Jie Xu has focused her research on boron isotope analyses, including the in-situ analysis of boron isotopes in tourmalines and mica, and has published these results. In her current research at the Institute for Geosciences as part of her dissertation, she developed a method to measure in-situ boron isotope ratios and trace element concentrations for micro-pellet samples with low boron contents using a laser ablation split-stream system (LA-SF-ICPMS). The outcome is currently under review at the international journal *Geostandards and Geoanalytical Research*. In the next step of her dissertation, she will extend the method to nano-pellets, as the micro-pellets were inhomogeneous. Therefore, she plans to mill the rock powder down to the nano-level, without losing focus on avoiding boron contamination. The goal is to measure the boron isotope fractionation in subduction zones directly on the samples instead of only using an empirical determination, as before. She will use the prize money for the appropriate equipment to produce and analyze the nano-pellets.

Furthermore, she developed a Python program for boron isotope data processing, which is freely available (https://boron-reduction.streamlit.app/). It is a great concern to her that scientists have the courage to make their self-developed programs accessible to the scientific community, which is why she has led corresponding sessions at both Goldschmidt 2023 and EGU 2024.

Jie Xu's high level of self-confidence, curiosity, unlimited motivation, and conscientious work in the lab qualify her for the Beate-Mocek Prize.

Andreas Wittke (Mannheim)

DMG SHORT COURSE "NUMERICAL MODELLING OF CHEMICAL DIFFUSION IN PETROLOGY AND GEOCHEMISTRY" – REPORT

This year's relatively new short course "Numerical Modelling of Chemical Diffusion in Petrology and Geochemistry" was held for the second time, but has already established itself as an essential part of the German Mineralogical Society's program. From March 11 to 15, numerous interested students, doctoral candidates, post-docs and professors gathered at the Institute for Geosciences at the Johannes Gutenberg University Mainz to learn the basics of numerical modeling on the topic of chemical diffusion. The mostly international participants represented a wide range of disciplines in the geosciences and were able to deepen their specialist knowledge throughout the course and apply it directly to their respective fields of research. Whether resource or structural geology, sedimentology, or classical mineralogy—the understanding of diffusion processes can significantly improve all areas.

Under the lead of Prof. Dr. Evangelos Moulas and his team, theoretical and practical knowledge was conveyed in a meaningful way. Mathematical derivations were always supplemented by practical code demonstrations in order to optimize the learning process. The course content ranged from the fundamental principles of diffusion and numerical modeling to more complex tasks. In the beginning, the finite difference method (FDM) was learned, which is one of the simplest but very effective methods for solving diffusion problems. The final code was continuously extended with additional components until a multi-component diffusion model was created. This may have been a more complex code, but was still comprehensible in every step. In this way, all course participants were able to follow the development of the source code and even adapt it to their own individual research questions, if necessary, by asking questions to the team. The content was concluded on the last day with an introduction to finite element method (FEM) and impressive modeling by the Metamorphic Processes working group.

In addition to the intensive learning, the leisure activities were not neglected. The historic city of Mainz, known as "Aurea Moguntia" (Latin for "Golden Mainz"), offered participants the opportunity to enjoy culinary and cultural delights and recharge their energy after each day. Social and scientific exchange moments were created between both young and experienced participants. This contributed to an inspiring environment and created anticipation for upcoming DMG events.

Participants of the diffusion workshop in front of the lecture hall "Muschel" (Shell) at the Johannes Gutenberg University Mainz. PHOTO: I. URALOVICH.

In conclusion, we would like to recommend all scientists, whether aspiring or established, to participate in this course. The team around Evangelos Moulas not only imparts specialist knowledge in a comprehensible and fascinating way, but even creates enthusiasm for mathematics and programming—and no one is left behind in the field.

Alexander Blum and **Larissa Lenz** (Heidelberg University)