Full Original German Text at GMIT, 2021, Vol. 83, Papes 56-58, v. Blankenburg & Fischer: Die DMG – eine persönliche Standortbestimmung. Translated with www.DeepL.com/Translator (free version), finally edited by Chr. Vogt.

How is mineralogy organized today?

The DMG represents the mineralogical sciences as a link mineralogy as a link between material and geosciences. Its portfolio includes geochemistry, petrology and crystallography. All of these disciplines are linked by highly disciplines is formed by the high-tech analytics, which is shared and taught to our students. Despite the increasing importance of these disciplines especially in research on the extraction, use and recycling of raw extraction, use and recycling of raw materials for the energy turnaround, but also in central fundamental issues, for many years there has been a the number of university teaching posts has been declining for many years. The number of university teaching positions has been declining for many years. While there were 123 professorships in the year 2000 in these disciplines at German universities, in 2020, there will only be 92 professorships. In crystallography in particular there has been an excessive downsizing. Despite this reduction in the workforce, the Mineralogy diversified its portfolio in recent years with new with newer areas such as environmental mineralogy, interface geochemistry, computational Mineralogy, Biomineralization or Nanomineralogy.

What are the questions today?

The disciplines of the DMG have have always been at the center of the most exciting geo- and material sciences fundamental topics: How materials determine the internal dynamics of our planet, the connection between the explosiveness of volcanic eruptions and degassing, water in the Earth's mantle, the chemical weathering that has regulated the Earth's climate over millions of years, the co- evolution of minerals and microbes in the Earth's history. Beyond the Earth, the disciplines provided highly sophisticated but also miniaturized instruments for the big questions, for example in the search for the foundations of life on Mars and on comets. We also are reconstructing the detailed chronology and mechanisms of planetary accretion. The mineralogical material and raw material sciences investigate the genesis of mineral raw materials and their raw materials and their processing: Minerals as oscillating crystals in electronics, Ruby and garnet for laser technology, asbestos with its hazardous properties , and zeolites as one of the most important material material groups for catalysts and ion exchangers with a production of over million tons per year. All this has high economic importance and would be unthinkable without the results of mineralogical research. With ab-initio modelling, precise crystal structures and at the same time structure-property relationships such as heat conduction, ionic conduction, and even isotopic fractionation can be determined. All of this is truly an impressive port- folio. But is it enough for the future?

What are the questions for the future?

In view of the rapid acceleration of analytical and computer-aided possibilities a prognosis for the next few years breakthroughs is similar to looking into the proverbial crystal ball. Do they lay in computer-aided structural models, which can simulate molecular geological processes such as mineral-fluid interactions and complex new materials and their properties in great detail or in experimental mineralogy on the nanoscale? In the elucidation of the origin of life on mineral

surfaces, the understanding of the composition of Earth's core, which controls the Earth's magnetic field, or the discovery of life on asteroids? The British petrologist and geochemist John Ludden, the long-time director of the British Geological Survey, has identified some future questions that he calls "Ex- geosciences," in a provocative article (Ludden, J., 2020: Where is Geoscience going? Geol. Soc. Special Publ., 499). Thus, the probable colonization of the moon and the exploration of new types of mineral deposits there would lead to a momentum in planetary petrology. On Earth one could drill into magma chambers in order to modulate the magmatic system or as a source of geothermal energy. The development of extreme heat sensors would finally allow us to explore the surface of Venus. And for the safe use of the subsurface, we could seal geological faults with biogeochemical engineering measures. All these are dreams of the future, which excites our scientific imagination.

But actually the following point is very important for us. The expertise of the DMG disciplines is at the heart of the great challenges facing mankind today. Within the next 30 years, our economies must expand fossil-free energy generation if we are to meet the 1.5°C limit of the Paris 2015 climate agreement. This transition will require enormous amounts of rare (so-called "critical") metals such as lithium for battery storage and huge quantities of the rare earth elements neodymium and dysprosium, which are for the production of high-performance permanent magnets used in wind turbines. These metals must be found, produced at 3 to 10 times the rate of today, and also recycled. The production of hydrogen and its storage requires development of new materials. "Negative CO_2 emissions" include both the capture of carbon at depth as well as newer approaches such as artificially induced weathering of mafic rocks. Also in the development of repositories for highly radioactive nuclear waste, mineralogical and geochemical exploration is at the forefront of the developments in assessing the safety of the "geological barrier" in deep underground structures or in the structures and use of zeolites and other minerals in the "engineered barrier". All this must be done without repeating the mistakes of the past - production at the expense of future generations and at the expense of the environment and the local population. "Sustainable use of earth resources" is also is also a topic of mineralogy.

What is to be done?

Mineralogy has to realize again that its contribution both in the fundamental applications as well as in the socially relevant aspects is not sufficiently perceived. Even within the geosciences, the major topics mentioned above are usually not associated with mineralogy. Is a problem of perception the reason? Or has mineralogy expanded its field of scope of application to such an extent that it is submerged in those sciences in which it is used and has thus become almost invisible? This thesis was formulated by John Brady, former president of the Mineralogical Society of America, on the occasion of its centenary (Brady, J. B., 2015: Assuring the future of Mineralogy. American Mineralogist, 100). Whatever the reason, there are three options for the DMG, its disciplines, and its scientists.

1) We should be far more active on the big questions for the future of our planet far more actively and not stand on the sidelines. Possible formats are research alliances, the design of curricula in which climate change is likely to play an increasingly important role, and more active participation in university committees and in societal and policy deliberations.

2) Within the geosciences we may state with greater self-confidence and constructively that mineralogical understanding is an essential component for the solution of these future questions. The umbrella geosciences offers an excellent forum for this.

3) Our students, only a few of whom will become "mineralogists" or "geochemists" in the strict sense of the word, we we need to convey how our disciplines and methods can help them later whether they remediate groundwater contamination, in prospecting energy resources, developing materials, or predicting geohazards such as earthquakes or volcanic eruptions. If mineralogy also has a role to play those young people who are supporting the "Fridays for Future" movement they need to see how their own future is related to development of practical solutions, but do not know in which professional field they can put this into practice. We would like to discuss these questions with you (*in German communities, added by Chr. Vogt)*. As soon as this is possible again, we would like toe to hold a workshop "The future of mineralogy in teaching and research" which could not be realized last year due to Corona restrictions.