Mineralogical Society of Poland

www.ptmin.pl

NEW PEOPLE IN CHARGE OF MINERALOGICAL ORGANIZATIONS IN POLAND

Mineralogists in Poland can participate in two organizations: the Mineralogical Society of Poland (PTMin) and the Committee of Mineralogical Sciences of the Polish Academy of Sciences. The Mineralogical Society of Poland was founded in 1969 and welcomes those whose scientific research or interests are in mineralogy, petrology, and geochemistry. The PTMin regularly organizes lectures, meetings, conferences, and publishes in English in its journal *Mineralogia*.

Professor Jakub Kierczak

Prof. **Jakub Kierczak** from the University of Wrocław (Poland) has been recently elected as the new president of the society. Prof. Kierczak is an environmental mineralogist known for his work on metal mobilization both from metallurgical slags and from within ultramafic geoecosystems.

Professor Janusz Janeczek

The PTMin collaborates with other scientific organizations, particularly with the Committee of Mineralogical Sciences of the Polish Academy of Sciences. The committee is an opinion-forming body that consists of twelve members, each elected for a four-year term. The committee is currently led by Prof. **Janusz Janeczek** from the University of Silesia (Poland). Prof. Janeczek is a mineralogist working in the field of environmental mineralogy and is perhaps best known for his involvement in the study of the Oklo (Gabon) natural nuclear reactors. The main role of the committee is to emphasize the importance of mineralogical and related sciences to politicians and society.

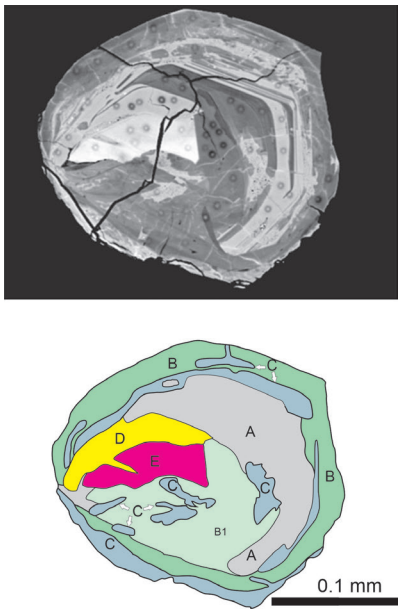
Recent activities of both organizations will be summarized in an issue of the society's *Bulletin* (available on-line in Polish) and in *Elements*.

MINERALOGISTS ARE, FOR THE FIRST TIME, RECIPIENTS OF THE STASZIC AWARD

The Staszic Award is named after the geologist Stanisław Wawrzyniec Staszic (1755–1826), who was a leading figure in the Polish Enlightment. The award is presented every other year to honour outstanding results achieved by Earth scientists working in Polish institutions. This year's recipients are Bogusław Bagiński (University of Warsaw, Poland) and Ray Macdonald (University of Lancaster, UK) who published a series of academic articles on the rare earth element (REE)–Ti silicates of the chevkinite group minerals (CGMs). The CGMs are rare accessory phases, but, as demonstrated by Bagiński and Macdonald, they play a vital role in the crustal distribution of the REEs. Below, the recipients give us an insight into the significance of their work:

Looking for chevkinite. (**left**) Professor Ray Macdonald; (**right**) Professor Bogusław Bagiński

"The CGMs occur in a very wide range of crustal rocks, including igneous rocks ranging from mafic to silicic, granulites and gneisses, hydrothermal and pegmatitic rocks, skarns and ore deposits. The range of host lithologies attests to the remarkable range of temperature and pressure conditions under which the CGMs may form, perhaps unique among REE-rich minerals. A total of 55 elements have been recorded in CGMs in the literature, in amounts ranging from ppm to tens of weight percent; there is considerable compositional diversity, resulting in many substitution schemes and structural varieties. Definition of these various types has been an important part of our work and was published in *American Mineralogist* [Macdonald et al. 2019, see below].



(**top**) Back scattered electron image and (**bottom**) simplified interpretation of the crystal of a Nb-rich chevkinite-(Ce) which displays very complex internal zonation. An oscillatory zoned crystal (zones A and D) was replaced during one or more phases of hydrothermal alteration (zones B, C, and E). Modified from Stachowicz et al. (*American Mineralogist*, 2019, v104, pp1481–1486)

Like many REE-bearing accessory minerals, CGMs are prone to metasomatic alteration: that is, the introduction and/or removal of chemical components through interaction of the host rock with fluids. With REE_2O_3 contents up to 50 wt%, and with lesser, but significant, abundances of such elements as Zr, Nb, and the actinides, they can contribute to significant element mobility during metasomatism and, ultimately, to the origin of rare-metal ore deposits.

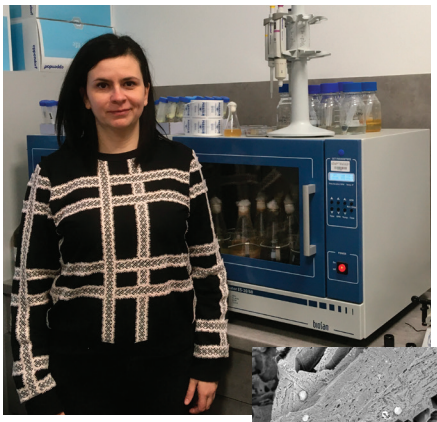
The last three decades have seen an exponential increase in the use of REEs in diverse aspects of modern technology, such as in permanent magnets for vehicle motors and wind generation, high-density batteries, phosphors for screens and lighting, and medical imaging contrast media. Although CGMs have not been described as the main REE carrier in any deposit, they will be part of the REE mined mix. Thus, a knowledge of CGM chemistry and petrogenesis will be important for beneficiation and exploration."

In their work, Bagiński and Macdonald paid special attention to hydrothermal alteration of CGMs, trying to elucidate the mechanisms and roles of different fluids operating in different geological environments during REE mobilisation. The authors are complementing these studies by collaborating with colleagues in GFZ Potsdam (Germany) in simulating alteration under tightly controlled laboratory conditions. One of the outcomes of this collaborative work is the finding that the alteration products are dependent on the composition of the host rock, the composition of the CGMs, and the pressure, the temperature, and the composition of the fluids (especially the activities of F, CO_2, and Ca).

The most recent results of their study can be found in Bagiński et al. (*European Journal of Mineralogy*, 2018, v30, pp367–373), MacDonald et al. (*European Journal of Mineralogy*, 2018, v30, pp135–147), MacDonald et al. (*American Mineralogist*, 2019, v104, pp348–369), and Upton et al. (*Mineralogical Magazine* 2019, v83, pp855–867).

DOMEYKO AWARD GOES TO A MINERALOGIST

The Domeyko Award is presented every other year to a young scientist for outstanding contributions to mineralogical or geological sciences. This year's recipient is Anna Potysz (University of Wrocław, Poland) who was honoured for her work on the bioweathering of copper metallurgical slags. The work is interdisciplinary and, as Dr Potysz says, it is "in the forefront of many disciplines: geochemistry, mineralogy, soil science and microbiology." She continues: "I address the problem of environmental contamination by metallic pollutants at sites impacted by industrial activity. Of particular interest to me is the geochemical stability of metal-laden industrial wastes, namely 'slags' disposed of long ago without the appropriate environmental oversight. The presence of such contaminated sites, with a lack of proper impermeable barriers designed to prevent metal migration, may require remediation actions be taken to avoid further contamination."



Experiments are running – Dr Anna Potysz in her laboratory.

Bacteria are picky eaters – fayalite crystals are removed from a slag by microbial activity.

The work has many laboratory challenges, and the experimental work has mostly been done at a laboratory that was designed, set up, and led by Dr Potysz herself. She started from scratch, and now her laboratory is a place of scientific collaborations, both in Poland and internationally. This is how Dr Potysz describes her work: "I perform laboratory simulations demonstrating interactions of industrial wastes with soil and vegetation cover. I evaluate the impact(s) of soil microbial organisms, root exudates, and soil organic matter on bioweathering of minerals and their synthetic equivalents [i.e. slag components]. I run toxicity tests (mainly with plants) and I am engaged in phytoremediation: that is, the search for efficient plants, as well as suitable conditions for, the 'rehabilitation' of polluted soils in the vicinity of former industrial centres."

To learn more on the challenges of working with bacteria, please check the latest publications by Anna Potysz: these include, Potysz et al. (*Journal of Environmental Chemical Engineering*, 2020, doi.org/10.1016/j.jece.2020.104450); Potysz et al. (*Construction and Building Materials*, 2020, doi.org/10.1016/j.conbuildmat.2020.118474); Potysz and Kierczak (*Minerals*, 2019, doi.org/10.3390/min9090542); Potysz et al. (*Journal of Geochemical Exploration*, 2019, v206, pp1–14); Potysz et al. (*Applied Geochemistry*, 2018, v98, pp22–35); Potysz et al. (*Chemosphere*, 2017, v178, pp197–211).

European Mineralogical Union

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EMU RESEARCH EXCELLENCE MEDAL 2020 WINNER

Dr Oliver Plümper

The recipient of the 2020 Research Excellence Medal of the European Mineralogical Union (EMU) is Dr Oliver Plümper from Utrecht University (the Netherlands). He receives the award for his outstanding contributions to the mechanics and implications of fluid–mineral interactions and for his international collaborative research.

Dr Plümper has established himself as a leading researcher in fluid–rock interactions and their consequences for a wide range of geochemical and geophysical processes. His research has had considerable impact in the fields of fluid–mineral/rock interaction, nanogeosciences, and mineral deformation. He has shown how chemical reactions at the mineral interface scale are coupled to mechanical deformation to induce large-scale alterations of the oceanic lithosphere. He is also well-known for clarifying how fluids are initially released in dehydrating systems. With the insights that these results have provided, he has been able to link fluid fluxes in subduction zones to the global water cycle. His research is genuinely transdisciplinary and is characterized by investigations that span the full scale from geological outcrops to nanometre-size mineral defects. His findings also have implications for important societal issues, including earthquake nucleation and propagation, CO_2 sequestration, and nuclear waste encapsulation.

His broader activities have marked him out as a leader who will undoubtedly continue to make a major contribution to geoscience research. He investigates mineralogical questions by using multi-scale analytical techniques that range from X-ray tomography to transmission electron microscopy and from Raman spectroscopy to numerical modelling. He actively contributes to the transnational access scheme of the European Plate Observing System (EPOS), which provides access to advanced facilities and mineralogical expertise across Europe.

For his seminal contributions to fluid–mineral interactions and for his far-reaching interdisciplinary and international collaborative research, Dr Oliver Plümper is a highly deserving recipient of the 2020 Research Excellence Award of the European Mineralogical Union. The medal will be presented during the 2021 Goldschmidt Conference in Lyon (France), or during an appropriate virtual ceremony.

For more information about nominations for the 2021 EMU Research Excellence Medal, visit http://eurominunion.org/?page_id=152.