International Mineralogical Association

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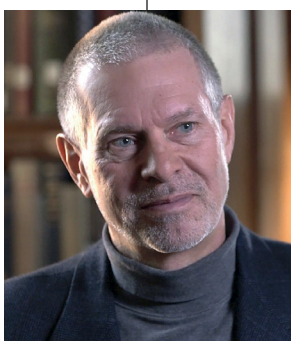
2021 MEDAL OF EXCELLENCE IN MINERALOGICAL RESEARCH

The International Mineralogical Association (IMA) is honored to present its 2021 Medal of Excellence in Mineralogical Research to Robert M. Hazen, who is Senior Staff Researcher at the Carnegie Institution for Science's Geophysical Laboratory (Washington, DC) and Clarence J. Robinson Professor Emeritus of Earth Sciences at George Mason University (Virginia, USA) (https://hazen.carnegiescience.edu).



Robert M. Hazen

Robert was trained as a geologist at Massachusetts Institute of Technology (USA) for his BS and SM, and then moved to Harvard University (Massachusetts, USA) for a PhD in mineralogy and crystallography, which was awarded in 1975. The initial focus of his research was the evolution of mineral structures at high pressure and temperature using diamond anvil cells and four-circle X-ray diffractometers. Notably, this work included olivine and periclase, the important components of the Earth's upper and lower mantle, respectively. In 1976, Robert joined the Geophysical Laboratory at the Carnegie Institution for Science and, through the subsequent decades, his work has provided us with incisive and original contributions on a variety of topics, from cutting-edge research on crystal chemistry to explorations of the role of minerals in the origin of life, backed up by methodologically challenging experiments at extreme pressures and temperatures. More recently, his research has also delved into processes that tie together the evolution of the geosphere and biosphere. Robert has become widely recognized for developing the concept of mineral evolution, which is a new field aimed at assessing the diversity and distribution of minerals produced through Earth's history. This work led to the recognition that different telluric planets and moons achieve different stages of mineral evolution and that around 50% of the known terrestrial minerals are actually associated with the emergence and spread of life! This new research necessitates the management of "big data" and network analysis, which have also had a profound impact on other areas of mineral sciences.

Hazen's research straddles the boundary of many fundamental disciplines—including mineralogy, organic chemistry, mathematics, and biology—and has led to fundamental breakthroughs in science. He has played a pivotal role in initiating several major collaborative research platforms, notably the Deep Carbon Observatory (DCO, deepcarbon.net). He was named the executive director and principal investigator of the DCO in 2008, which was a 10-year project to study the chemical and biological roles of carbon in the Earth's interior: this was sponsored by the Alfred P. Sloan Foundation and the Carnegie Institution. The DCO Science Network is an immense international scientific success, now comprising more than 1,200 members from 55 different nations and involving researchers at various stages of their career. This collaboration has produced over 1,400 peer-reviewed manuscripts. Furthermore, under the leadership of Robert and DCO researchers, 31 new carbon-bearing minerals have been discovered (mineralchallenge.net), an achievement celebrated recently at the 2019 Geological Society of America meeting.

In recognition of his excellence in mineral sciences, Robert M. Hazen has received many awards: the 1982 Mineralogical Society of America (MSA) Award, the Ipatief Prize of the American Chemical Society (1986), the MSA's Roebling Medal (2016), and he was elected as a fellow or foreign member by several professional societies. The biomineral hazenite [$KNaMg_2(PO_4)_2 \cdot 14H_2O$], a recent addition to the struvite group, was discovered at Mono Lake (California) by Yang et al. (2011) and named in Robert's honor.

Robert M. Hazen has also earned international acclaim for his unparalleled contribution to science communication, education, and outreach. He gave talks and interviews on National Public Radio, NOVA PBS, Carnegie Science, Mineral Talks Live, Academic Influence (Hazen 2015, 2016, 2021a, b) and numerous other public broadcasting and online streaming programs. In collaboration with physicist James Trefil, Robert penned a bestseller on scientific literacy (Hazen and Trefil 2009) and three textbooks. *The Story of Earth* (Hazen 2013) was named a semi-finalist for the 2013 Royal Society (London) Science Book Prize and one of the top 25 non-fiction books of 2012. This book paved the way for a 60-lecture series, exploring an impressively diverse range of topics, from the history and principles of the scientific method to the periodic table, radioactivity, entropy, Earth cycles, evolution, and the fossil record (www.thegreatcourses.com/courses/joy-of-science). In recognition of his efforts as an educator, Robert was appointed a distinguished lecturer by the MSA (2003–2004), National Science Foundation (2007), and several other organizations, and received the MSA's Distinguished Public Service Medal (2009) and the Virginia Outstanding Faculty Award (2011).

Remarkably, Robert is also an accomplished musician, having performed professionally with the National Gallery Orchestra (1977–2010), Washington Chamber Symphony (1977–2003), and several other collectives in North America and Europe. Perhaps, it is not surprising then that his published legacy includes not only over 450 journal articles and 25 books on science and technology, but also contributions on history, music, and poetry.

We congratulate Professor Robert M. Hazen on this lifetime achievement award (the Medal of Excellence) and look forward to his plenary lecture at the 23rd IMA General Meeting in Lyon (France) (www.ima2022.fr), where the medal will be presented.

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BOJARITE: MINERAL OF THE YEAR 2020

For 2020, the Mineral of the Year title has been awarded to bojarite, discovered by a research team led by Nikita V. Chukanov (Russian Academy of Sciences, Moscow). The mineral was discovered in a guano deposit on the northern slope of the Pabellón de Pica Mountain in the Tarapacá Region of northern Chile and named in honor of Hans-Peter Bojar (Universalmuseum Joanneum, Graz, Austria). It

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European Mineralogical Union

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EMU POSTER PRIZES AWARDED AT EMC2020

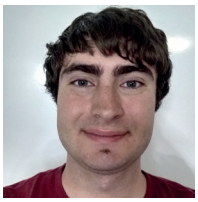
During the 3rd European Mineralogical Conference (emc2020), which took place from 29 August to 2 September 2021 in Cracow (Poland), the Poster Prize Committee of the European Mineralogical Union (EMU) awarded six excellent poster contributions: the young talented researchers won three Poster Awards and three Honorable Mentions. Brief descriptions of the recipients' scientific interests are given below.

Poster Awards

Tommaso Battiston

POSTER TITLE: **"Thermal and Compressional Behaviour of Natural Borates: a Potentially Aggregates in Radiation-Shielding Concretes"**

Tommaso Battiston is a PhD student at the University of Milan (Italy). He researches the behaviour of geomaterials at non-ambient conditions, in particular the crystal–fluid interactions in microporous compounds at high pressure and temperature.



Johannes Pohlner

POSTER TITLE: **"Inter-Mineral Fe Isotope Fractionation in Eclogites of the Münchberg Massif (Germany) as a Function of Oxidation State"**

Johannes Pohlner is a PhD student at the University of Fribourg (Switzerland). He uses trace element and oxygen isotope geochemistry on the bulk-rock and mineral scale to reconstruct igneous, hydrothermal, and metamorphic processes in high-pressure rocks, with a special focus on Fe isotopes. His other research interests are U–Pb geochronology of accessory minerals, and the tectonic evolution of the peri-Gondwana terranes during the Paleozoic.

Henrique Straioto

POSTER TITLE: **"Modification of Natural Zeolites to Remove the Herbicide (2,4-dichlorophenoxy)acetic acid from Water through the Adsorption Process"**

Henrique Straioto is a PhD student at the State University of Maringá (Brazil). His scientific interests are in the field of civil construction, including the treatment of water and sanitary/industrial effluents.

Honorable Mentions

Mateusz Skalny

POSTER TITLE: **"Desulfurization of Liquid Fuels by Ag Modified Fly Ash Derived Na-X Zeolite-Carbon Composite"**

Mateusz Skalny is a PhD student at the AGH University of Science and Technology in Cracow (Poland). He is developing liquid fuel desulfurization by adsorption using mineral adsorbents. His research is focused on modifying porous mineral materials using transition metals (such as nickel, copper, or silver) and applying them as adsorbents for organosulfur compounds present in different fuels. This novel procedure may decrease refining costs and sulfur dioxide emissions to the atmosphere.

Veronica Stopponi

POSTER TITLE: **"Mobility of Volatile-Bearing Magmas in Oxidised Planetesimals: Implications for CO_2 Loss and Storage during Accretion"**

Veronica Stopponi is a PhD student at the Sapienza University of Rome (Italy). She is interested in investigating the properties of melts and glasses as they undergo extreme pressure and temperature conditions and how this might apply to processes occurring in the deep Earth and other planetary interiors. In particular, she aims to understand mantle magma dynamics by experimentally determining the viscosity and atomic structure of volatile-rich melts at high pressures and temperatures by the use of synchrotron techniques.

Shashi Tamang

POSTER TITLE: **"Barrovian Metamorphism in the Lesser Himalayan Sequence of Central Nepal seen through the Eyes of Aluminous Metapelites"**

Shashi Tamang is a PhD student at the University of Turin (Italy). He researches the variation in metamorphic CO_2 outputs from the Nepal Himalayas along strike and compares past production of CO_2 with present emissions. His research project is focused on the processes responsible for both past and present-day metamorphic CO_2 production in the Nepal Himalaya.

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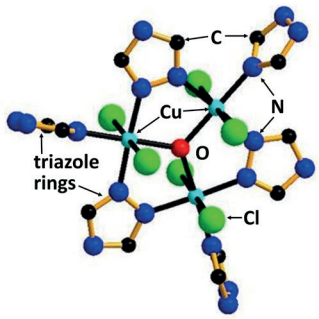
occurs as blue, fine-grained, porous, aggregates up to 5 mm in size. Associated minerals are salammoniac, halite, chanabayaite, nitratine, and belloite. Bojarite is a copper triazolate mineral; its ideal formula is $Cu_3(N_3C_2H_2)_3(OH)[Cl_2(H_2O)_4]\cdot 2H_2O$ (Chukanov et al. 2020).



Bojarite crystallizes in the cubic system (space group $Fd\bar{3}c$). Its elegant crystal structure, refined from powder X-ray data using the Rietveld method, comprises Cu^{2+} cations interconnected by a hydroxyl anion at the center of an equilateral triangle and further bonded to a pair of N atoms in the triazole ring $(N_3C_2H_2)^-$. These triangular building blocks are linked together into a 3-D network via the third N atom in each ring; the coordination of Cu^{2+} is completed by two longer bonds with Cl (Fig. 1).

Bojarite is a supergene mineral formed as the result of alteration of chanabayaite in the contact zone between a deeply altered guano deposit and chalcopyrite-bearing amphibole gabbro. This discovery is the ninth new mineral found in the guano deposit at Pabellón de Pica. It is worth noting that another mineral from that same occurrence, chanabayaite, was selected as the Mineral of the Year in 2015.

REFERENCES

Chukanov NV and 7 coauthors (2020) Bojarite, $Cu_3(N_3C_2H_2)_3(OH)Cl_2\cdot 6H_2O$, a new mineral species with a microporous metal–organic framework from the guano deposit at Pabellón de Pica, Iquique Province, Chile. Mineralogical Magazine 84: 921-927, doi: https://doi.org/10.1180/mgm.2020.85