Mineralogical Society of America

PRESIDENT'S LETTER

MSA at 100: Mineralogy Research

Mickey Gunter

"The orientational dependence of the physical properties of minerals" is one of the answers I give when someone asks about my research interests. The main physical properties that interest me are the refractive indices, and I was fortunate enough to study how they change as a function of composition and structure for andalusite. This resulted in my first paper in the *American Mineralogist* back in 1982 and showed how an orthorhombic mineral could be optically isotropic. This paper contrasts with the first paper published in the *American Mineralogist* in 1916, "The Occurrence of Lamellar Calcite in Rhode Island" by Alfred C. Hawkins. While the author could measure optical properties, composition was done with wet-chemical methods. Diffraction of X-rays by crystal had only been discovered in 1912.

There was no mention of X-rays in an *American Mineralogist* title until 1927, when C.H. Stockwell used them to determine the unit cell of garnets, and, in turn, used it to help predict the garnet's composition. Before that, refractive index and specific gravity had been used; thus, this paper showed for the first time how the physical properties of minerals relate to their structure. At this point, indirect methods to determine composition were very useful, because it was easier to use such indirect methods than to determine the composition by wet-chemical methods. In the next year (1928), a paper was published entitled, "The Oscillation Method of X-Ray Analysis of Crystals," by John Gruner. I suspect there are few dues-paying members of MSA who have ever taken an oscillation photo, while several senior members have. Regardless, this was the first method used to obtain crystal structure information. The same year, Gruner used this method to determine that the crystal structure of "analcite" was isometric, having a = 13.64 Å and "16 molecules of $NaAlSi_2O_6 \cdot H_2O$" in its "unit cube." Among other things, these data allow us to calculate the density, instead of determining the specific gravity. And 91 years later, Gruner's formula and cell edge remain the same; all that has changed is that we now call this mineral "analcime."

1919 – CENTENNIAL – 2019

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Turning to the composition of minerals, when the Mineralogical Society of America (MSA) was formed, it was not uncommon to see ideal formulas for minerals written in terms of their oxides, instead of the now-used chemical formulas. For example, analcime would be written as $1/2Na_2O \cdot 1/2Al_2O_3 \cdot 2SiO_2 \cdot 1H_2O$. This practice was followed for two reasons: 1) at this point, we lacked the understanding of how elements would fit into a mineral because we did not know their structures; 2) compositions were determined by wet-chemical methods. Many of us will recall the inorganic chemistry lab where we were given a solid unknown, dissolved it, then precipitated portions of it, and very carefully weighed each. At that point, I most certainly did not realize I was determining the composition of the material, as I was so concerned about performing the "technique." Fortunately, just as X-rays allowed us to determine structures, the development of electron beam techniques, especially Raimond Castaing's development of the electron microbe in the late 1940s—which occurred unbeknownst to me when I was in grade school—allowed for precise and accurate determination of the composition of micron-sized mineral grains in polished grain mounts or thin sections.

Finally, I'm pictured (see left) at the National Synchrotron Light Source II at Brookhaven National Laboratory in Upton (New York, USA) where we worked to understand the orientational dependence of absorption spectra. To study these, we used a spindle stage, whose precursor was described in a 1924 *American Mineralogist* article by Paul Kerr entitled, "A Simple Rotation Apparatus." Of course, it would be helpful if we could calculate these spectra from first principles, but we have yet to accomplish that or to even be able to calculate refractive indices. We have also yet to understand fully what external shape minerals will take as they crystalize, which is basically the question asked by Alfred Hawkins back in 1916. However, as noted above, we have made many advancements in the first 100 years of our society, and there are many yet to come in the next 100!

Mickey Gunter
2019 MSA President

NOTES FROM CHANTILLY

- Balloting for the 2019 election of MSA officers and councilors is underway. The slate of candidates follows. President: Carol D. Frost (University of Wyoming, USA); Vice President (one to be selected): Howard W. Day (University of California-Davis, USA) and Mark Ghiorso (OFM Research, USA). Secretary (one to be selected): Kim Tait (Royal Ontario Museum, Canada) and Razvan Caracas (École normale supérieure de Lyon, France). Council position 1 (one to be selected): Przemyslaw Dera (University of Hawaii, USA) and Mainak Mookherjee (Florida State University, USA). Councilor position 2 (one to be selected): Fangzhen Teng (University of Washington, USA) and Francis McCubbin (NASA Johnson Space Center, USA). Thomas S. Duffy (Princeton University, USA) continues in office as Treasurer. Continuing Councilors for 2020 will be Jay J. Ague (Yale University, USA), Donna L. Whitney (University of Minnesota, USA), Mark J. Caddick (Virginia Tech, USA), and Adam C. Simon (University of Michigan, USA).
- MSA will be celebrating its centennial year at the Geological Society of America Meeting (GSA) in Phoenix (Arizona, USA) on Monday, 23 September 2019 with an all-day session entitled "MSA at 100: Reflections, Refractions, Diffractions, Intrusions, Subductions, Reactions, Etc." from MSA Past Presidents. The session is chaired by MSA President Mickey Gunter and will include the Presidential Address. In addition to the MSA Past Presidents' all-day session, there are two more sessions to mark MSA's centennial year:
  - T28. "Mineralogical Society of America at 100: The Many Faces of Tourmaline—From Crystallographic Complexity to Recorder of Crustal Evolution." Organizers: Darrell J. Henry, Barbara L. Dutrow.
  - T24. "Metamorphic Petrology Past, Present and Future: Preparing for the Next 100 Years with the Mineralogical Society of America." Organizers: Robert M. Holder, Mark J. Caddick, Sarah C. Penniston-Dorland.
- MSA at GSA will also include its Awards Luncheon; Awards Lectures; Joint Reception among MSA, Geochemical Society, and GSA's MGPV (Mineralogy, Geochemistry, Petrology, and Volcanology) Division; Annual Business Meeting; Council Meeting; Past Presidents Breakfast; and a booth in the exhibit hall.
- The MSA Awards Lunch is Tuesday, 24 September 2019 for presentation of the Roebling Medal to Peter R. Buseck (Arizona State University, USA); Dana Medal to Matthew J. Kohn (Boise State University, USA); Distinguished Public Service Medal to Rodney

C. Ewing (Stanford University, USA); 2019 MSA Award to Olivier Namur (University of Leuven, Belgium); and the 2018 MSA Award to Laura Nielsen Lammers (University of California-Berkeley, USA). The MSA Awards Lectures are the same day beginning at 3 pm. The MSA Annual Business Meeting is at 5 pm, followed by the MSA/GS/MGPV Joint Reception which will be from 5:45 pm to 7:30 pm.

- Topical sessions have been proposed for awardees:
  - T26. "Visions of Minerals at the Nanoscale: In Honor of Mineralogical Society of America Roebling Medalist Peter R. Buseck." Organizers: Mihály Pósfai, Jill F. Banfield, Lindsay P. Keller.
  - T18. "The Solidification Path of Magma—Information from Igneous Rocks, Eruptions, and Experimental Petrology: In Honor of the Mineralogical Society of America Awardee for 2019, Olivier Namur." Organizers: Michael D. Higgins, Bernard Charlier.
  - T38. "Effects of Mineral–Water Interface Complexity on Geochemical Processes: A Session in Honor of Mineralogical Society of America Awardee for 2018, Laura Nielsen Lammers." Organizers: Benjamin Gilbert, Donald J. DePaolo, Garrison Sposito, Rick Ryerson.

50- AND 25-YEAR MSA MEMBERS

The following individuals will reach 50 or 25 years of continuous membership in the Mineralogical Society of America during 2019. Their long support of the society is appreciated and is recognized by this list and by 50- or 25-year pins mailed this year. If you should be on this list and are not, or have not received your pin, please contact the MSA Business Office.

50-Year Members

Antonio Cendrero
John Sloan Dickey
Ahmed El Goresy
Rosalind T. Helz
Yosuke Kawachi
Paul Keller
Fritz A. Pfaffi
Charles B. Roth
Ian Steele
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Pan Yuanming
Art F. White
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VOTE

2019 MSA ELECTIONS

MINERALOGICAL SOCIETY OF AMERICA UNDERGRADUATE PRIZE FOR OUTSTANDING STUDENTS

MSA welcomes the following exceptional students to the program's honor roll and wishes to thank the sponsors for enabling the Mineralogical Society of America to join in recognizing them. The MSA Undergraduate Prize (MSA-UP) is for students who have shown an outstanding interest and ability in mineralogy, petrology, crystallography, and geochemistry. Each student is presented with a certificate at an awards ceremony at his or her university or college and receives an MSA student membership that includes a subscription to *American Mineralogist*, *Elements*, and a Reviews in Mineralogy and Geochemistry or an MSA Monograph volume chosen by the sponsor, student, or both.

Past MSA-UP awardees are listed on the MSA website, as well as instructions on how MSA members can nominate their students for the prize.

- **Megan "Forest" Balemian-Spencer**, Pomona College (California, USA). Sponsored by Dr. Jade Star Lackey.
- **Alix Marie Ehlers**, University of Vermont (USA). Sponsored by Dr. John Hughes.
- **Shane K. Houchin**, Pasadena City College (California, USA). Sponsored by Dr. Martha House.
- **Sydney Klinzing**, University of Wisconsin-Madison (USA). Sponsored by Dr. Professor Huifang Xu.
- **Ranpeng Li**, University of California-Santa Barbara (USA). Sponsored by Prof. Roberta Rudnick.
- **Felice Lugos**, University of California-Santa Barbara (USA). Sponsored by Prof. Matthew E. Rioux.
- **Eleanor McLeod**, University of Victoria (Canada). Sponsored by Prof. Dante Canil.
- **Erikka Renee Olson**, Williams College (Massachusetts, USA). Sponsored by Prof. Reinhard Wobus.
- **Owen Perfect**, University of British Columbia (Canada). Sponsored by Dr. James Scoates.
- **Matthew Raabe**, Towson University (Maryland, USA). Sponsored by Dr. Wendy Nelson.
- **Addison K. Savage**, University of Texas at Austin (USA). Sponsored by Dr. Elizabeth Catlos.
- **Jonathan Umbsaar**, University of Calgary (Canada). Sponsored by Dr. J. Alex Speer.
- **Caroline Cominey Wolcott**, Furman University (South Carolina, USA). Sponsored by Dr. William Ranson.

IN MEMORIAM

James H.C. Martens – Life Fellow (1924)
Hidemichi Hori – Senior Member (1980)
Raymond J. Butler – Senior Member (1978)
Peter Robinson – Senior Fellow (1960)