THE MONTHLY NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

The Mineral Minutes

Volume 76-04
April 2018

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Prez Says...

by Dave Nanney
MSDC President

March winds bring April showers bring May flowers. Well we sure had some of those March winds. Following the estimates for the peak cherry blooms, we're thinking our azalea blooms will be the third week in April. Just a couple of weeks ago, we thought things were coming very early. Oh, well. Can't beat Mother Nature.

John Weidner kicked it out of the park last month in his presentation on Garnets. It was interesting seeing him build on his original Silicate talk, with both a short refresher on the silicate structures, followed by a very educational discussion on Susan Fisher's favorite (?) minerals. What some could only guess at, is that John went shortly after that to the doctor to have his pneumonia diagnosed. So all the development effort, and all the presentation energy, was blanketed by the fact that John was very sick. I am simply in awe of his strength, and by the way, it was a very good talk. N!

LOST AND FOUND

Left at the meeting in March. A nice Raspberry Garnet, 2" x 2" with a hand written label attached.

April Program

"Smithsonian Acquisitions at Tuscon this Year"

Presented by Dr. Jeffrey Post

What is your dream job? Mine is "Curator-In-Charge" of the Smithsonian Institution's National Gem and Mineral Collection. Unfortunately for me, I do not have this job. Dr. Jeffrey Post does. But luckily, Dr. Post is willing to meet and share with us some of the experiences, challenges and opportunities that are part of the job. Those of us who were lucky enough to attend the MSDC 75th anniversary celebration in December 2017, know what a wonderful speaker Dr. Post is. And we are pleased to once again welcome Dr. Jeffrey Post as our presenter this month.

Dr. Post majored in Geology and Chemistry at the University of Wisconsin – Platteville, earning a Bachelor of Science degree in 1976. He then earned a Ph.D. in Chemistry, with a specialty in Geochemistry, from Arizona State

March Business Meeting Synopsis

By Andy Thompson, Secretary

President David Nanney called the meeting to order and thanked the previous club presidents in attendance for their service. He welcomed Steve Tzikas as the club's newest member as well as Professor Richard Tollo, wife Stacie, and two GWU students majoring in earth science, Maggie Moss and Francesca LoVerde. Dave also welcomed Jacob Wirth, a first time visitor to MSDC.

The group then discussed recent and upcoming mineral-related events, including the annual Micromounters' Conference on April 6-7. For the dates of additional events see the calendar listings below. Dave then called for approval of the February Business Meeting Minutes as published in the March newsletter. Ed Fisher motioned to approve them with the correction of event dates as needed. The motion was seconded and unanimously approved whereupon Steve Johnson, editor, immediately incorporated those corrections and resent a redacted edition of the March Mineral Minutes newsletter to the entire list of recipients.

Given there was no old or new business brought up for discussion, a motion was made to conclude the business meeting, which motion was seconded and approved.

Dave then had the pleasure of honoring the recipient of the 2018 Foshag-Hronik-Dhyse Award. He introduced George Washington University Professor Richard Tollo who thanked MSDC for supporting, for the last 17 years, the research GWU award recipients have been conducting. He noted that previously honored students have gone on to make many professional contributions in diverse area of earth sciences, including one who is now a university professor. Richard introduced last year's recipient, Maggie Moss, who thanked the club for her grant which enabled her to conduct geological research last summer on the Blue Ridge and Yellow Stone National Park areas. She noted her work will continue this summer in Yellow Stone. Richard then introduced this year's recipient, Francesca LoVerde who this summer will also conduct her thesis-related research on the metamorphic rock of Yellow Stone. She offered to return to a future club meeting to share her findings. Dave, on behalf of the membership, welcomed Francesca's offer and thanked Richard for his partnership with MSDC in helping the club fulfill its mission to promote education in mineral-related sciences.

MSDC also received the following note, delivered personally at our March meeting.

To the Folks at MSDC,

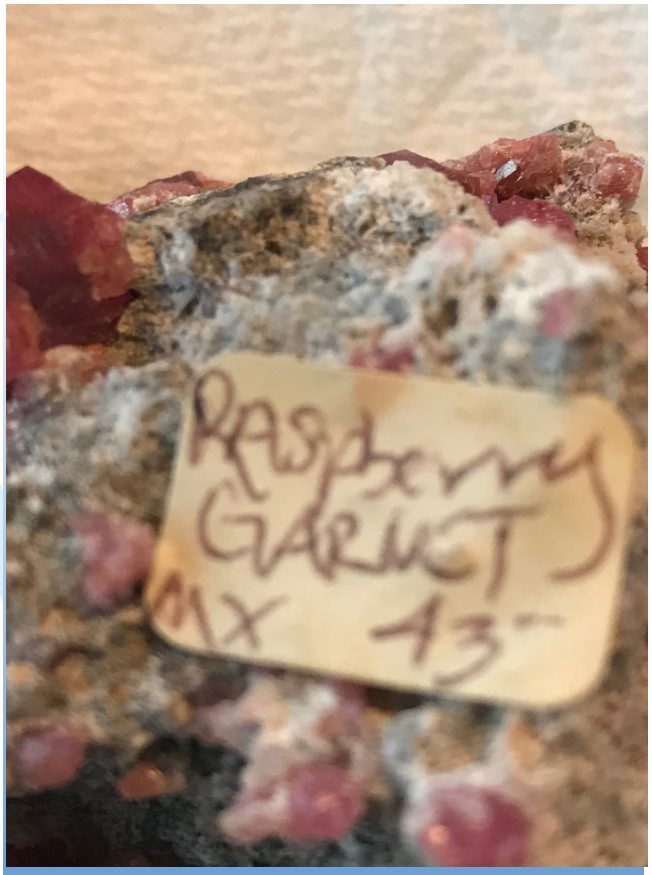
Thank you so much for making me your award recipient last year. Your support has made all the difference in my geological career, and I would not be where I am today without you! It is because of people like you that young people in science can and will continue to pursue their goals, innovate, and achieve.

Thank you again from the bottom of my heart,

Maggie Moss

MSDC Award Recipient 2017

It will visit the meeting looking for the owner. Nice piece…. Just saying.



Editor's Note: Crystal Shapes are from Goldschmidt's "Atlas der Krystallformen"

CLUB INFO

MINERALOGICAL SOCIETY OF
THE DISTRICT OF COLUMBIA

Meetings are the First Wednesday of the Month (Jan-Jun and Sep-Dec). We meet in the lobby of the Smithsonian National Museum of Natural History at 7:45pm.
WEBSITE http://mineralogicalsocietyofdc.org/
FACEBOOK www.facebook.com/MineralogicalSociety-OfTheDistrictOfColumbia

2018 Officers & Directors

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University in 1981. Prior to joining the Department of Mineral Sciences at the Smithsonian Institution in 1984, he was a Postdoctoral Research Fellow for three years in the Department of Geological Sciences at Harvard University. From 1989 to 1994, and again from 2014 to the present, he served as the Chairman of the Department of Mineral Sciences, and in 1991 he became the Curator of the National Gem and Mineral Collection. In addition, Dr. Post served as the lead Curator for the Janet Annenberg Hooker Hall of Geology, Gems and Minerals that opened in 1997. His areas of research interest include mineralogy, gemology, geochemistry, crystallography, and electron microscopy. He has published nearly 100 articles in these fields. In 2011, the mineral Postite, a rare hydrous decavanadate, was named in his honor.

Dr. Post's presentation will take us on a journey of the Smithsonian Institution Department of Mineral Sciences activities over the last year, including visits to and acquisitions at Tucson Mineral Show in February 2018 – acquisitions made possible in part from a donation made by MSDC. Come see and hear about the specimens that our donation helped the museum to acquire!

Please join us in taking Dr. Post to dinner on April 4th before the club meeting. We will be meeting at 6:00 pm at Elephant & Castle Restaurant, 1201 Pennsylvania Ave, NW, Washington, DC, about 2 blocks from the Smithsonian Institution National Museum of Natural History (NMNH) where our club meeting is held. If you cannot make it to dinner, we will meet in the NMNH lobby at 7:30 pm and head up to the Cathy Kerby Room for Dr. Post's presentation.

March Program: "Garnets!"
Presented by John Weidner

By Andy Thompson, Secretary

Dave Nanney, standing in for MSDC Program Chair Dave Hennessey, introduced John Weidner, MSDC Treasurer, as a Ph.D. in mathematics, former university professor, and a man "in recovery" from an enduring cold. In addition, John is a fellow Virginian whose house recently lost power for several days due to stormy weather immediately prior to the evening's presentation.

Despite these challenges, John was able to address the fundamental issues of defining what constitutes a garnet, what defines a mineral, the what is the chemical composition of each of the six types of garnets. Given the limitations of time and power outages at home, he could only hint at the second part of his intended presentation, how individual types of garnets originated at the various depths, temperatures and pressures within the earth.

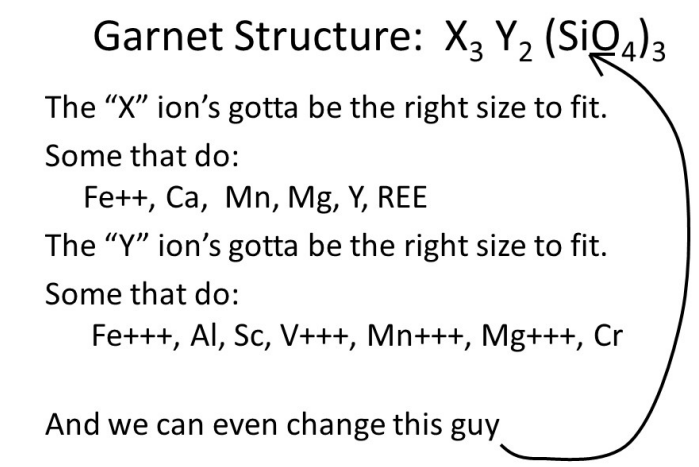
John introduced himself as having no particular training in the mineralogy of garnets but rather a passion for bringing mathematical order to learning. Consistent with that desire, prior to the meeting John arranged six tables down the center of the Cathy Kerby room, one table for each of the six types of garnets which members brought as show-and-tell specimens, as well as additional tables for local and/or unidentified garnet specimens.

From the diverse shapes and colors of garnets pictured below, John said one could get the impression that this mineral is somewhat chaotic in its make-up. One of John's pleasures in life is to discover and explain the underlying order lurking just beneath the wide diversity and variations of minerals such as garnets. Despite the differences in size, color, shape and chemical element components, there is an underlying structural order.

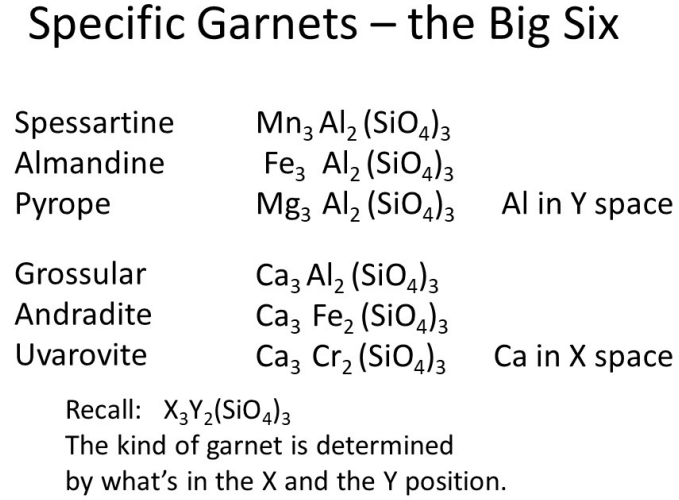
(Insert "John W 1a and 1b" photos of garnets about here: such as the large yellow and small red garnets)

John described a garnet as a solid which occurs in nature, is inorganic, has a placement of atoms defined by the general formula X3 Y2 (SiO4)3, where what is in the X space and Y space determines which of the six types of garnet a particular specimen will be. The above formula is what provides the underlying structural regularity and order of the garnet family of minerals.

In the following two slides, John spells out which ion elements "fit" into the X and Y spaces of the garnets and allow each garnet to distinguish itself within the broad family of garnet minerals. He pointed out that all six garnets, of course, are silicates, that is, they all share the common (Si04)3 component.



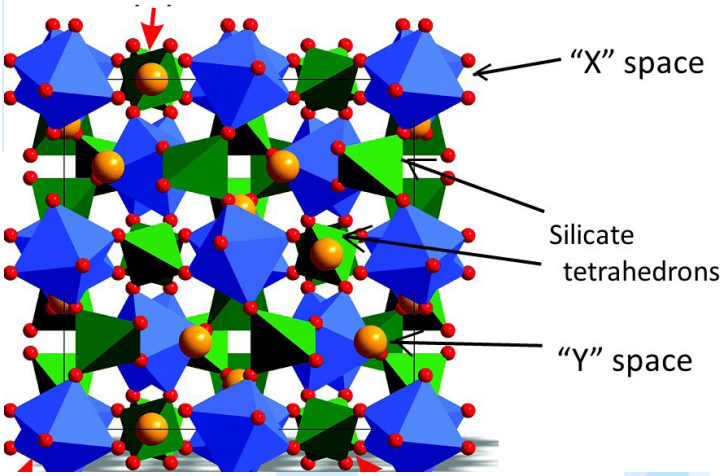
He noted the size of the ion really does matter. An iron ion having a valence of +2 is larger than one having a valence of +3. The larger iron ion fits well into the X site. On the other hand, the iron ion having an electrical imbalance of +3, having three more protons than electrons, has a tighter structure and so can snuggle into the Y site as a perfect fit.



He pointed out that when the X space is filled with a calcium (Ca) ion, we have grossular, andradite and uvarovite garnets. When the Y space is filled with an aluminum (Al) ion, we have spessartine, almandine and pyrope garnets.

Simply put, the kind of garnet is determined by what is in the

Garnet Structure



X and the Y positions.

John provided a colorful illustration (below) of the garnet crystal structure, which literally points to the positions occupied by the X ions (blue), the silicate tetrahedrons (green), and the Y ions (orange).

The title of the evening's presentation, "Garnets and Metamorphism," suggested John originally intended to tell two stories, the first telling what constitutes a garnet, and the second, how the six garnets had different origins (metamorphisms). Due to the bad weather and loss of electricity in the area of the nation's capital, MSDC attendees were treated primarily to the first, the nature of garnets.

By way of a summary, John used the following two slides. The first spells out the properties all six garnets share in common such as their technical structure, shape, color and

Garnet Properties

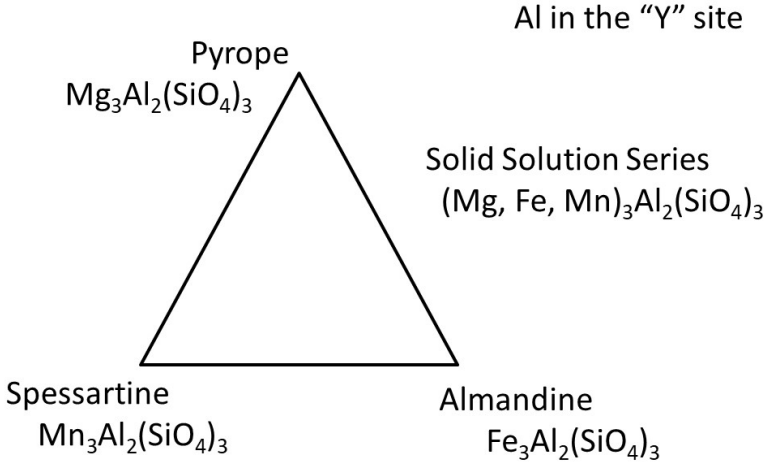
- Technical Properties
  - Isolated tetrahedra (Nesosilicate)
  - Isometric crystal system
  - Dense
- Shape
  - Equant
  - No cleavage – conchoidal fracture
  - Stand out from matrix
- Color
  - Until 1990, "Any color but blue."
  - Resinous to vitreous
- Other Hand sample properties
  - Hardness
  - Streak

characteristics such as hardness.

At the same time, despite those common properties, the chemical structure of the six garnets can also be more complex. Recall that of the six species of garnet, there are two sub-groups, the first where three species, the pyrope, spessartine and almandine all have aluminum in the "y" site and magnesium, manganese or iron, respectively, in their X site. But what happens if the percentage of these X elements decreases from 100% to 90% and to lesser amounts? Mineralogists have a way of expressing these variations described by the triangle pictured in the "Specific Garnets – Pryrospite Series" below. Such occurrences are described by an illustration called a "solid solution series". As an example, John noted, the percentage of aluminum in the almandine garnet is constant at 100%, but the amount of iron is 100% only at the vertex, the outside edge of the triangle. The percentage of iron decreases as one moves away from the vertex, toward the center of the triangle, where iron is at about 50% and decreases toward zero at the triangle side opposite the vertex.

A similar solid solution series exists for the three garnets which have calcium in the "X" site. It is called the Ugrandite Series and it describes the grossular, andradite and uvarovite garnets. These series require further explanation but they point to the mineral collectors' common experience that within each of the six types of garnets, collectors see variations in color and streaks which suggest there are

Specific Garnets – Pyrospite Series



chemical variations within each of the six types of garnet.

John concluded by encouraging listeners to remember:

- A garnet is a garnet because of the way the atomic elements in it are arranged.
- Garnets can be any color (including blue, found in Madagascar).
- In geology, garnets are known as a metamorphic indicator, but garnets also form "ingeniously."
- Garnets are hard, dense and pretty.

The above third bullet, that garnets are a metamorphic indicator, points to the second story John hoped to share with his audience, namely how each of the six garnets has a different set of geologic conditions, temperatures and pressures, which tell us of their origins. Hint: pyrope garnets, for example, can be indicators that kimberlite and diamonds are nearby. That second story will have to wait for a future date when stormy conditions have passed and reliable electricity plus good health allow John more prep time to unpack the metamorphic origins of garnets.

After the audience's grateful applause subsided, John fielded one question about the solid solution series illustration. John had implied during his presentation that occasionally the illustration for a particular garnet had gaps in the percentage of the mineral making up the X component of the equation.

Such gaps seemed counter intuitive to the notion of there being a continuum in the chemical composition as one moved out from the vertex and toward the opposite side of the triangle. John responded that mineralogists do indeed find such gaps exist in the percentages of minerals and that "sometimes, for a particular species of garnet, a perfect continuum does not exist on the surface of the earth."

Dave Nanney thanked John for his presentation and encouraged everyone to continue the conversation in the back of the Kerby room. He thanked those who brought

"Show and Tell"

In the spirit of this month's presentations on the Smithsonians new acquistions, the club would like for members to bring in new or exciting specimens from their collections.

Editor's Thoughts on Fossils leading up the next article.

There are five types of fossil categories which I will discuss in a second. Since I deal with data in much of what I do at work, I was thinking about the two as I walked to work this morning. I had just read an article that morning on dinosaur tracks being found in Scotland and that lead me to my line of thinking.

First let's think about data. When dealing with relational data, the relationships that you encounter are: One to One, One to Many, Many to One, Many to Many. Why was I thinking about this in relation to fossils? You'll see.

The five categories of fossils are: (1) Mold and Cast Fossils, (2) Petrification Fossils, (3) Whole Body Fossils, (4) Footprints and Trackways, and (5) Coprolites.

Molds and casts are when a plant or animal is buried under layers of sediment and decays leaving the impression of its body left in the rock forming around it is known as a mold fossil. Sometimes the space left behind is filled with other sediment, forming a cast fossil. Most dinosaur bones fall into the mold and cast category.

Petrification occurs when groundwater permeates the remains of an organism and replaces it with minerals. In replacement fossils, the body dissolves and minerals are left in its place. In permineralization, water enters the cells of the organism and deposits minerals in the spaces inside them. Petrified wood is a permineralized fossil.

Whole Body Fossils. Whole body fossils occur when an entire organism, including soft tissues, is preserved. Examples include insects entombed in tree sap, which hardens to become amber, and mammoths encased in ice.

Footprints and Trackways are made by prehistoric animals walking through the soft sediments that sometimes harden and become fossils. Several footprints occurring together and made by the same animal are referred to as a trackway. Trackways may also include impressions made by other parts of the animal, such as the tail or snout.

And last but not least we have Coprolites which are fossilized feces. Their location offers clues about where animals lived. Close examination of coprolites can also yield information about what the animals that produced them ate.

Now, why data? One to one relationships are going to be the least common type of fossil. Petrification and whole body fossils are one to one relationships. One to Many relationships are represented by footprints and trackways. One individual or group of individuals can make hundreds or thousands of impressions. Coprolites...obviously one to many!! Some Molds and cast can also be one to many. Consider trilobites...and since we live near the Chesapeake we're generally familiar with crabs. Trilobites molted their shells like crabs do today. Most of the trilobites we see at shows today are fossilized shells, not the whole creature. Thus one creature can produce many fossils in its lifetime.

Just my thoughts while wandering to work. Now Here's the article.

Dinosaur footprints discovered on Scottish island

From Yahoo News

Dinosaur footprints dating back 170 million years have been discovered on a Scottish island and will help shed light on the reptiles' evolution, the University of Edinburgh said on Tuesday.

The footprints are in a muddy, shallow lagoon on the Isle of Skye.

The largest print, left by a sauropod, measures 70 centimetres (28 inches) across. Long-necked sauropods were up to two metres tall.

"The find is globally important as it is rare evidence of the Middle Jurassic period, from which few fossil sites have been found around the world," the university said in a statement.

Researchers are documenting about 50 footprints in the area, including those of theropods -- an ancestor of Tyrannosaurus rex -- which measure around 50 centimetres across.

They used drone photographs to make a map of the site.

Paige dePolo, who led the study, said the find "demonstrates the presence of sauropods in this part of the world through a longer timescale than previously known".

The research was carried out in conjunction with the Chinese Academy of Sciences and the findings have been published in the Scottish Journal of Geology.

A sauropod footprint discovered on the Scottish Isle of Skye, among a cluster of prints which date back 170 million years (AFP Photo/Handout)

Mineralogical Society of America Editors' Picks

With the permission of Keith Putirka, the following are the Editor's picks of Highlights and Breakthroughs & Invited Centennial Articles from the February 2018 issues of the American Mineralogist: Journal of Earth and Planetary Materials.

http://www.minsocam.org

Outer Planet and Early Earth Organic Minerals

On page 341 of this issue, Hazen provides an overview of a study by Maynard-Casey et al., of minerals on Titan (on page 343 of this issue), a satellite of Saturn. Maynard-Casey et al. examine a database containing about 800,000 organic molecular structures and find about a hundred that should be stable near Titan's surface environments given its atmospheric composition and thermal conditions. Their hope is that an identification and systematization of Titan near-surface mineralogy will help refine out hypotheses about the nature of that distant planetary body. As Hazen points out, their work may further inspire new work closer to home, i.e., the search for possible "extinct" organic mineral species that might have ruled an ironically pre-biotic Earth. One strand of thought is that some such minerals, overlooked in current mineral evolution models, may have acted as pre-biotic pathways to RNA.

The Meaning of Oscillatory Zoning in Accessory Minerals

On page 355 of this issue, Melnik and Bindeman provide a new model to quantify diffusion-controlled growth for zircons from silicate melt. Their model can be applied to any accessory phase, but in this case provides an explanation for the oscillatory zoning of some zircon grains in felsic rocks. For example, they find that small temperature changes (<10 °C) are unlikely to cause dissolution, but affect growth rates sufficient to cause enrichments or depletions in trace elements (Y, Hf, REE) by a factor of two. They also predict that such T-controlled growth patterns will be subdued at >850 °C, which explains the rarity of oscillatory-zoned zircon in dry, high-T rhyolites. Their modeling also indicates that crystal zoning might also record the response of a system to minor pressure variations (35-50 bars, perhaps due to recharge, partial eruption of a pluton, etc.) as such variations cause shifts in water solubility. The illustrated wavelengths of the two end-member controls (T vs. water solubility) appear different, and so mapping of wavelengths may help determine which if either processed acts as a control on zircon growth.

An Oxybarometer for Arc Magmas

On page 369 of this issue, Shishkina et al. present new experiments and a new calibration for fO2-sensitive partitioning of V between Olivine and silicate melts, here extended to lower temperatures (1025-1150 °C) and hydrous conditions (0.6–6.5 wt% H2O) that characterize arc magmatism. Their new model can be used for arc systems generally, its use being illustrated at Mutnovsky volcano of Kamchatka, where the authors find highly oxidizing conditions from olivine melt inclusions, ranging from 1.9 to 2.3 log units above QFM. Perhaps a key result is that their diffusion modeling indicates much slower rates of re-equilibration of V relative to fO2 inside inclusions, which implies that V partitioning may provide a more reliable record of magmatic fO2 conditions.

Making Sapphires and Rubies by Partial Melting

On page 469 of this issue, Palke et al. provide a far-ranging and seemingly crucial study of sapphires and rubies from the U.S. and Thialand/Cambodia. Their trace element data and oxygen isotope data cast doubt on trace-element discriminant diagrams that purport to separate metamorphic from magmatically derived rubies and sapphires. Instead, they find that rubies and sapphires from their two localities, which plot solidly in a metamorphic field, are in fact magmatic in origin. The authors make use of the Fo-An-Q ternary at 2 GPa to illustrate their genesis, showing that corundum can form by partial melting of corundum-absent anorthosite protoliths, through peritectic melting reactions. The same phase relations further illustrate how even minor contrasts in bulk composition lead to different mineral inclusion assemblages (and by implication, significant contrasts in trace element contents for the resulting gem minerals).

Age Dating Hydrothermal Alteration (and late Stage Granite emplacement?)

On page 480 of this issue Capatani et al. describe a rare association of zircon and aeschynite precipitated on anatase, found in miarolitic cavities in a granophyre bulk composition host rock. The association, and the author's trace element and crystal-chemical study indicates that the association formed at low temperatures, of ca. 250 °C, which is not untypical for anatase, but is lower than the ca. 300-600 °C range often attributed to hydrothermal zircon precipitation. Their model is that the zircon that nucleates on anatase formed by the dissolution of primary hydrothermal zircons, with re-deposition at lower temperatures. Their finding opens the possibility for age dating hydrothermal activity over a much wider T range, and by extension, providing dates on the final emplacement of granites and expelled fluids.

Useful Mineral Links:

AFMS	American Federation of Mineralogical Societies (AFMS)	www.amfed.org
Eastern Federation of Mineralogical & Lapidary Societies, Inc.	Eastern Federation of Mineralogical and Lapidary Societies (EFMLS)	www.amfed.org/efmls
mindat.org	MINDAT	www.mindat.org
Mineralogical Society of America 1916 2016 American Mineralogist Centennial	Mineralogical Society of America (MSA)	www.minoscam.org
Friends of Mineralogy	Friends of Mineralogy	www.friendsofmineralogy.org/
	WebMineral	webmineral.com
The Geological Society of America	The Geological Society of America (GSA)	www.geosociety.org/
Scovil Photography	Jeff Scovil Mineral Photography (not advertising - just great photos)	scovilphotography.com/
USGS science for a changing world	United States Geological Survey (USGS)	www.usgs.gov
The Geological Society of Washington	The Geological Society of Washington (GSW)	http://www.gswweb.org/

Upcoming Local (or mostly local) Geology and Mineral Events of Interest:

April

4 MSDC April Meeting

7–8 45th Annual Mineral, Gem, Jewelry & Fossil show sponsored by the New Haven Mineral Club. Amity Regional Middle School, 1—Ohman Ave; Orange, CT. Info: www.newhavenmineralclub.org

12–15 Tar Heel Mineral Club annual show and EFMLS/AFMS Convention, Raleigh, NC; AFMS Annual Meeting - Thursday April 12; EFMLS Annual Meeting - Friday April 13; AFMS/EFMLS Awards Banquet - Saturday, April 14; Breakfast with the Editors & Webmasters - Sun. April 15; Info: www.amfed.org

14 14th Annual Earl & Malvina Packard Rock, Gem & Mineral Show sponsored by the Southeastern New Hampshire Mineral Club. Dover Veterans Community Center, 156 Back River Rd, Dover, NH. Info: Brian: 207-710-6254 or cshore108@yahoo.com

16 NVMC Meeting

18 MNCA Meeting

AFMS Code of Ethics

- I will respect both private and public property and will do no collecting on privately owned land without the owner's permission.
- I will keep informed on all laws, regulations of rules governing collecting on public lands and will observe them.
- I will to the best of my ability, ascertain the boundary lines of property on which I plan to collect.
- I will use no firearms or blasting material in collecting areas.
- I will cause no willful damage to property of any kind - fences, signs, and buildings.
- I will leave all gates as found.
- I will build fires in designated or safe places only and will be certain they are completely extinguished before leaving the area.
- I will discard no burning material - matches, cigarettes, etc.
- I will fill all excavation holes which may be dangerous to livestock. [Editor's Note/ Observation: I would also include wildlife as well as livestock.]
- I will not contaminate wells, creeks or other water supply.
- I will cause no willful damage to collecting material and will take home only what I can reasonably use.
- I will practice conservation and undertake to utilize fully and well the materials I have collected and will recycle my surplus for the pleasure and benefit of others.
- I will support the rockhound project H.E.L.P. (Help Eliminate Litter Please) and will leave all collecting areas devoid of litter, regardless of how found.
- I will cooperate with field trip leaders and the se in designated authority in all collecting areas.
- I will report to my club or Federation officers, Bureau of Land management or other authorities, any deposit of petrified wood or other materials on public lands which should be protected for the enjoyment of future generations for public educational and scientific purposes.
- I will appreciate and protect our heritage of natural resources.
- I will observe the "Golden Rule", will use "Good Outdoor Manners" and will at all times conduct myself in a manner which will add to the stature and Public "image" of rockhounds everywhere.

MEMBERSHIP APPLICATION OR RENEWAL
THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA (MSDC)

(___) Family ~ $25.00 per year. One address.

(___) Individual ~ $20.00 per year.

(___) New * (___) Renewal Dues are for Year _____*

For new members who join in the last months of the year, membership will extend through the following year with no additional dues.

ANNUAL DUES – PLEASE PAY YOUR DUES PROMPTLY.

Pay at next meeting or mail to:

Mineralogical Society of DC
c/o John Weidner
7099 Game Lord Drive
Springfield, VA 22153-1312

Name(s) (First and Last) _____

Address_____

City _____ State _____ Zip:_____

Phone(s): Home/Work/Mobile_____

Email(s): _____

OK TO INCLUDE YOU ON CLUB MEMBERSHIP LIST?

( ) Yes – Include name, address, phone, email.

If you want any information omitted from the membership list, please note:

Omit my: ( ) Email; ( ) Home phone; ( ) Work phone; ( ) Mobile phone; ( ) Address; ( ) Name

SPECIAL CLUB-RELATED INTERESTS? _____

Meeting Dates, Time, and Location: The first Wednesday of each month. (No meeting in July and August.) The National Museum of Natural History, Smithsonian Institution, 10th Street and Constitution Ave, Washington D.C. We will gather at the Constitution Avenue entrance at 7:45 PM to meet our guard who will escort us to the Cathy Kirby Room. Street parking: Parking is available in the Smithsonian Staff Parking – Just tell the guard at the gate that you are attending the Mineral Club Meeting.

THE MINERAL MINUTES

NEWSLETTER OF THE MINERALOGICAL SOCIETY OF THE DISTRICT OF COLUMBIA

Mineralogical Society of DC

Time Sensitive Dated Material
First-Class Mail