

# **Bulletin of the Mineralogical Society of Southern California**

Volume 94 Number 10 - October, 2021

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*The 994<sup>th</sup> meeting of the Mineralogical Society of Southern California*

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***With Knowledge Comes Appreciation***

## **A ZOOM Meeting**

***October 8<sup>th</sup>, 2021 at 7:30 P.M.***

***Program: Exploring Jezero Crater, Mars with the Perseverance Rover***

***Presented by: Dr. Sarah M. Milkovich***

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**Remember:** If you change your email or street address, you must let the MSSC Editor and Membership Chair know or we cannot guarantee receipt of future Bulletins

## About the Program: Exploring Jezero Crater, Mars with the Perseverance Rover

Presented by: Dr. Sarah M. Milkovich

Exploring Jezero Crater, Mars with the Perseverance Rover: For hundreds of years, the idea of an inhabited Mars has captured our imaginations, but our first close-up view of Mars showed it to be a cold, barren desert. For decades, NASA has been exploring Mars with a fleet of spacecraft to understand the role of water in its history and look for areas that in the past could have supported life. This work has paved the way for the Mars 2020 Perseverance Rover, which landed on Feb 18, 2021 in Jezero Crater with the ambitious mission to search for evidence of ancient bacterial life and to collect rock samples for eventual return to Earth. In the short time since landing, Perseverance has already been hard at work testing out its new capabilities and getting to know its new home.



Bio: Dr. Sarah M. Milkovich is a planetary geologist and systems engineer at NASA Jet Propulsion Laboratory, where she currently works on the Mars Perseverance Rover. Sarah specializes in the science operations of robotic spacecraft, bridging the science and engineering teams. In this capacity, she has spent over 15 years exploring Mars and Saturn with a variety of spacecraft. Sarah has won JPL and NASA team awards for her efforts to return the best possible science within spacecraft engineering constraints, as well as for excellence in outreach and public engagement. She holds a B.S. in planetary science from Caltech, and a [M.Sc.](#) and Ph.D. from Brown University in planetary geology with studies of ice on Mars, and volcanoes on Mercury.

### How to Join our ZOOM Meetings by Rudy Lopez

MSSC members will automatically be added to the invite list each month.

Non-Members must request to attend MSSC zoom meeting each month.

Please go to the MSSC website, <http://www.mineralsocal.org> to read our Bulletin for upcoming programs, then send Rudy Lopez an email, no later than the Tuesday before the meeting, to [programs@mineralsocal.org](mailto:programs@mineralsocal.org) and he will make sure you're contacted.

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### From the Editor: Linda Elsnau

How time flies. -- It's election time again. MSSC needs the participation of all of our members to remain vital and active. Please look into yourself to see what you could do to participate in the operation of this group. If you think you might be interested in a position, contact the person currently in that position to see what's involved.

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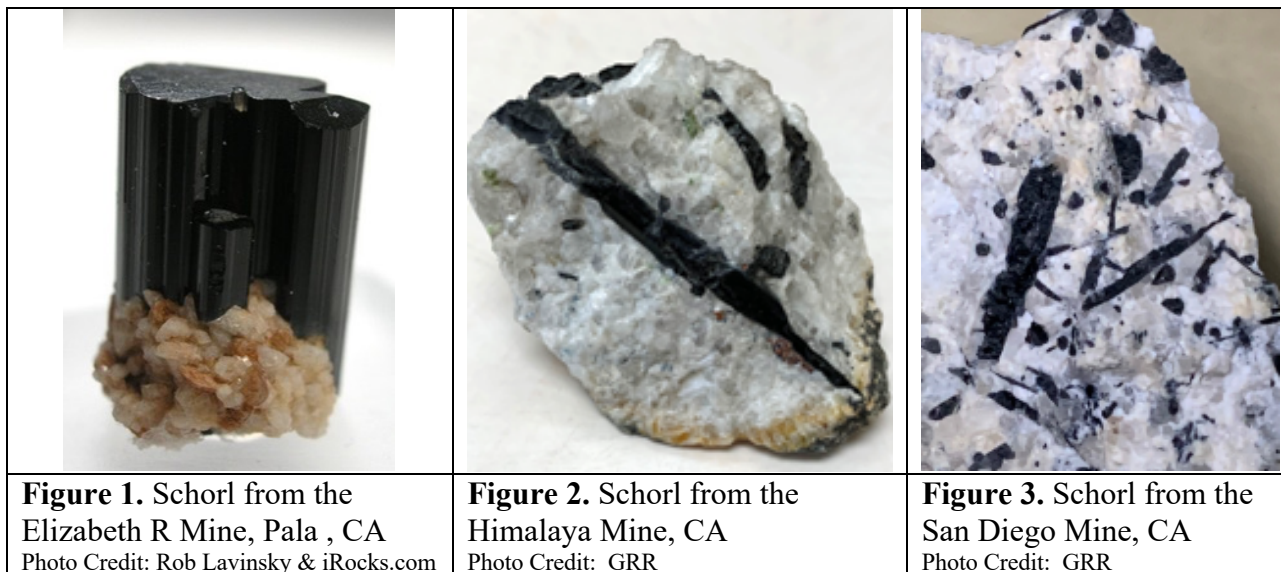
### FROM THE PRESIDENT: Interesting Minerals, A to Z. Round 2, Installment 19, the letter "S": : by George Rossman

#### Schorl

The early history of the mineral schorl shows that the name "Schorl" was in use prior to the year 1400 (AD) because a village known today as Zschorlau (in Saxony, Germany) was then named "Schorl" (or minor variants of this name). This village had a nearby tin mine where, in addition to cassiterite, a lot of black tourmaline was found. The name may have been first mentioned by Ulrich Rülein von Calw 1505. The first relatively detailed description of schorl with the name "schürle" and its occurrence (various tin mines in the Saxony Ore Mountains) was written by Johannes Mathesius (1504-1565) in 1562 under the title "Sarepta oder Bergpostill". Up to about 1600, additional names used in the German language were "Schurel", "Schörle", and "Schurl". From the 18th century on, the name "Schörl" was mainly used in the German-speaking area. In English, the names "shorl" and "shirl" were used in the 18th century for schorl. In the 19th century the names "common schorl", "schörl", "schorl" and "iron tourmaline" were used in the Anglo-Saxon area (Ertl, 2006).

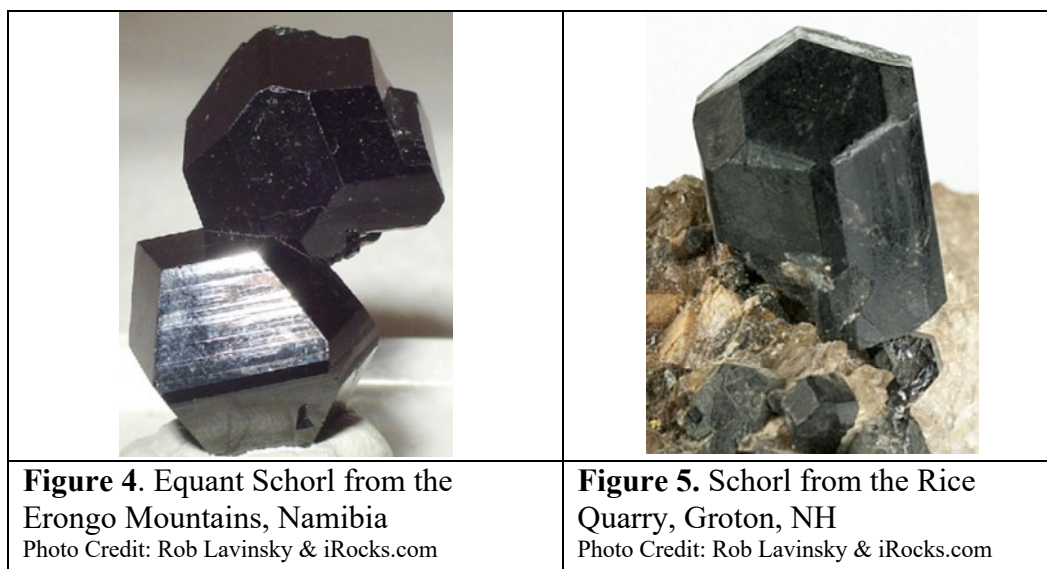
Ertl, A. (2006): Über die Etymologie und die Typlokalitäten des Minerals Schörl [About the etymology and the type-localities of schorl] Mitteilungen der Österreichischen Mineralogischen Gesellschaft, 152, 7–16 (in German with English abstract).

Schorl is probably the most common tourmaline. It found in pegmatites and some granitic rocks, worldwide. Here, in southern California and in northern Baja, there are several localities where schorl is found in the granitic rocks and in pegmatites (**Figures 1-3**).



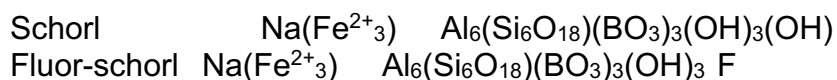
Why is schorl black? We all recognize schorl as the common black tourmaline (Figures 4,5). However, we know that several common iron 2+ minerals are not black. Examples include olivine which is green and almandine garnet which is red.

Mössbauer spectroscopy and wet chemical analyses have shown that schorl commonly contains a significant amount of iron in the 3+ oxidation state ( $\text{Fe}^{3+}$ ). Because the structure of tourmalines puts the  $\text{Fe}^{2+}$  right next to the  $\text{Fe}^{3+}$ , the energy of incoming light can easily slosh electrons back and forth between the  $\text{Fe}^{2+}$  and the  $\text{Fe}^{3+}$  in the process known as intervalence charge transfer. This process is very efficient at absorbing the light leaving schorl looking black (**Figures 1-5**). It is only when the crystals are cut very thin (around 30 micrometers thick) in what are known as thin sections, can one see blue, and brown colors in the crystals. The color is nearly always much more intense when the light is polarized perpendicular to the c-axis.



We now know that schorl is a bit more complicated than we realized even a couple decades ago. That is because schorl forms solid solution series with other species in the tourmaline group.

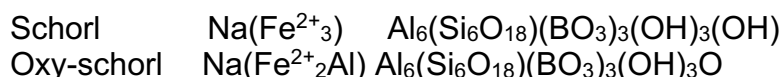
a) We can replace one hydroxide (OH) with a fluoride (F). Then we get the tourmaline species fluor-schorl.



Fluor-schorl is a recently discovered and described tourmaline species. The first paper describing it appeared in 2016 (Ertl et al.).

Ertl, A, Kolitsch U, Dyar MD, Meyer HP, Rossman GR, Henry DJ, Prem M, Ludwig T, Nasdala L, Lengauer CL, Tillmanns E, Niedermayr G (2016) Fluor-schorl, a new member of the tourmaline supergroup, and new data on schorl from the cotype localities. *European Journal of Mineralogy*, 28, 163-177.

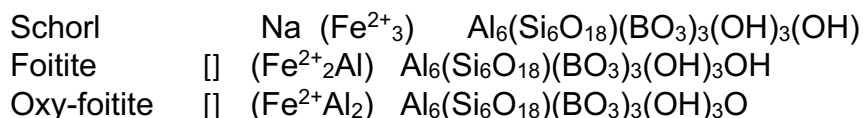
b) If the OH is replaced with an oxide we get oxy-schorl. But because oxide has 2 negative charges compared to just one with the hydroxide, we have to increase positive charge. This occurs by replacing one of the iron 2+ ions with aluminum 3+.



Oxy-schorl is also a comparatively recently discovered and described tourmaline species. The first paper describing it appeared in 2013 (Bačík et al.)

Bačík P, Cempírek J, Uher P, Ozdín D, Filip J, Novák M, Škoda R, Breiter K, Klementová M, Ďud'a R (2013) Oxy-schorl,  $\text{Na}(\text{Fe}^{2+}_2\text{Al})\text{Al}_6\text{Si}_6\text{O}_{18}(\text{BO}_3)_3(\text{OH})_3\text{O}$ , a new mineral from Zlatá Idka, Slovak Republic and Příbyslavice, Czech Republic. *American Mineralogist*, 98, 485-492.

c) If we remove a sodium ion (Na), we then make the tourmaline species foitite. But to maintain charge balance, we have to replace an iron 2+ with an aluminum 3+ ion. If the OH ion is replaced by an oxide, we get oxy-foitite, but must now replace one of the iron 2+ ions with yet another aluminum 3+.

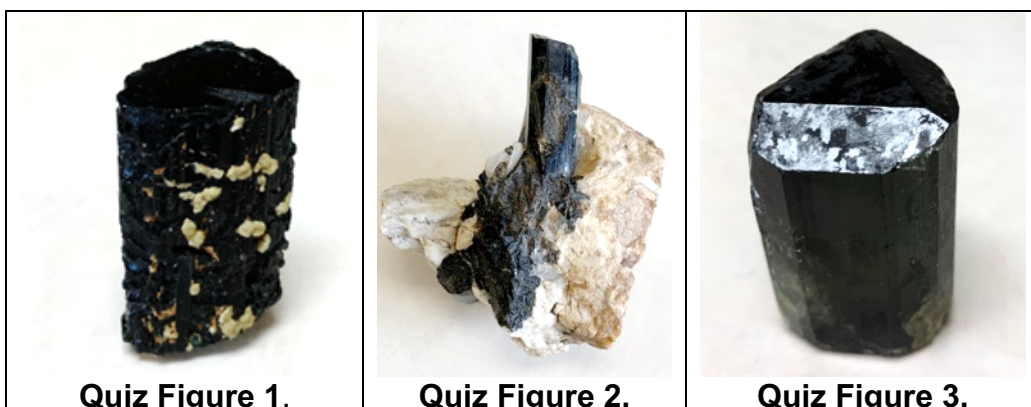


The description of foitite goes back to 1993 and oxy-foitite was first published in 2017.

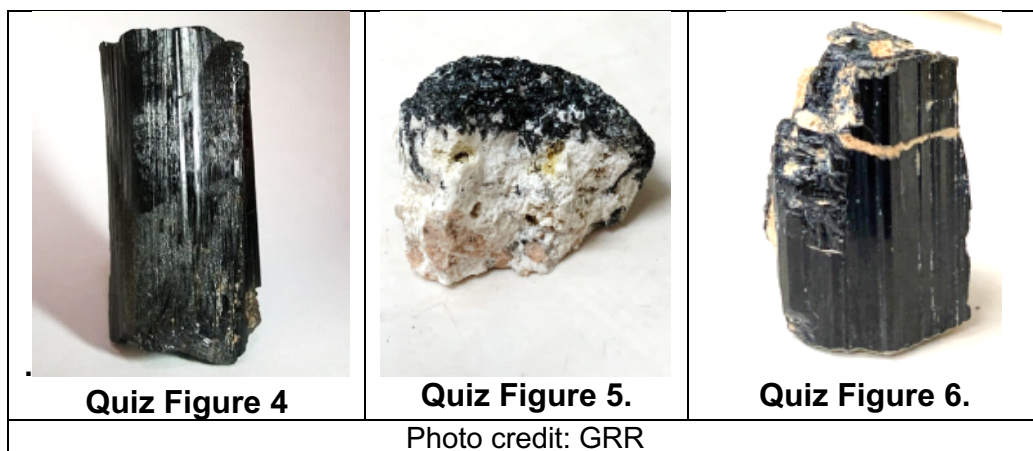
MacDonald, D.J., Hawthorne, F.C., and Grice, J.D. (1993) Foitite  $\text{Fe}_2^{2+}(\text{Al}, \text{Fe}^{3+})\text{Al}_6\text{Si}_6\text{O}_{18}(\text{BO}_3)_3(\text{OH})_4$ , a new alkali-deficient tourmaline: Description and crystal structure. *American Mineralogist*: 78: 1299-1303.

Bosi, F., Skogby, H. & Hålenius, U. (2017): Oxy-foitite,  $[](\text{Fe}^{2+}_2\text{Al}_2)\text{Al}_6(\text{Si}_6\text{O}_{18})\text{BO}_3)_3(\text{OH})_3\text{O}$ , a new mineral species of the tourmaline supergroup. *European Journal of Mineralogy*: 29: 889-896.

Now that you know about the complexities of black tourmalines formerly all called schorl, it is time for a quiz. Picture below are 6 pictures of black tourmalines. Which ones pictured below are actually schorl? .....







The answers follow later. The quiz is made difficult because other members of the tourmaline family can also contain iron in both the 2+ and 3+ oxidation states and become black. In fact, many of the specimens labeled 'schorl' in collections and for sale are most likely some other species of tourmaline. It is costly to accurately analyze a tourmaline to determine its species, so most specimens go unanalyzed and sometimes are incorrectly identified.

Are there commercial applications for schorl or technological uses? Very few exist. Of course, schorl can be sold on the commercial mineral specimen market. Online, you can find specimens of schorl that sell from \$3 to over \$1000 with nice crystals commonly in the several hundred-dollar range.

I have seen products containing ground tourmaline (schorl) incorporated in plastic objects that have been sold as antistatic devices to remove 'bad' ions from the air. Hmm; rather doubtful. Likewise, anti-static ceramic items with tourmaline are sold to straighten hair. More likely the heat and steam that they produce, but not the tourmaline, make these items work. Then there are a variety of products that claim to use the electromagnetic properties of black tourmaline to effect the body ..... I don't want to go any further in this direction.

Here are the answers to the quiz. All of the pictures are black tourmalines, but they represent several different tourmaline species. Only one is schorl.

Quiz Figure 1. Elbaite from the Dunton Quarry, Maine

Quiz Figure 2. Schorl from the Himalaya Mine, CA

Quiz Figure 3. Dravite from Gujarkot, Nepal

Quiz Figure 4. Foitite from the Schindler Mine, Little Cahuilla Mountain, CA

Quiz Figure 5. Luinaite-(F) from Ehrenfriederdsdorf, Germany

Quiz Figure 6. Elbaite from the Resplendor Mine, Brazil.

How many did you get correct?

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## **MINUTES of the September 10, 2021 General ZOOM Meeting**

### **Call to Order (Dr. Rossman):**

At 7:30 p.m., the 993rd Membership Meeting of the Mineralogical Society of Southern California (MSSC) was called to order by President Dr. Rossman, Ph.D. It was MSSC's 16th ZOOM conference meeting.

### **Message from the Chair (Dr. Rossman):**

Dr. Rossman welcomed everyone. He reports that the International Mineralogical Association's (IMA) has approved 5,739 species of minerals with special thanks to Dr. Tony Kampf.

### **Regular Business (Dr. Rossman)**

Minutes: Dr. Rossman called for approval of the August 13, 2021 Membership Meeting Minutes as published in the September 2021 Bulletin. He asked if there was a motion to approve the minutes. A motion was made

by Carolyn Seitz and seconded by Ahni Dodge. Dr Rossman asked if there were any corrections or additions and hearing none, called for the vote. The motion to approve the minutes passed unanimously.

### Announcements and Reports

1. Program/Education Chair Rudy Lopez announced: a) speakers are lined up through June 2022 and topics are “up-to-date”; b) the annual Orange County Park event has been cancelled due to the COVID pandemic. We look forward to their re-scheduled event in the spring of 2022.

2. Field Trip Chair, Marek Chorazewicz, reported that the Topaz Mountain field trip was well attended. There were some weather and other challenges that restricted the collecting areas. One attendee experienced a medical reaction requiring his extraction from the site; he is home and well. All in all, the trip was successful, and many nice specimens were collected.

### Program

Dr. Rossman turned the meeting over to Programs Chair, Rudy Lopez. Rudy introduced the night’s speaker, Dr. Alan Rubin, Ph.D. Dr. Rubin has a B.S. in Astronomy and a M.S. in Geological Sciences from University of Illinois; he earned his Ph.D. in Geology from University of New Mexico. He was a post-doc at the Smithsonian for a year before beginning his career at UCLA. At UCLA, he is a pioneering cosmochemist, a Research Geochemist and an Adjunct Professor (ret.) in the Department of Earth, Planetary and Space Sciences. He is published with more than 200 research papers, about 50 popular science articles. “Disturbing the Solar System” was published by Princeton University Press in 2004. He co-authored a new book, “Meteorite Mineralogy”, with Chi Ma; this book will be published in October. He has won 7 awards for some of his popular science writings. The mineral rubinite (2016) and Asteroid 6227, Alanrubin, (2002) are named in his honor. Dr. Rubin will present The Origin of Chondrules. Chondrules are sub-millimeter igneous spherules, found in chondrites (primitive meteorites derived from unmelted asteroids). Chondrules are among the oldest solid materials formed in the Solar System; chondrite rocks are the building blocks of all the bodies in the solar system.

Dr. Rubin begins The Origin of Chondrules with a spectacular photo of chondrules...

Then he asks

Why study meteorites? Indeed, why study meteorites? Dr. Rubin offers 8 reasons among which include: meteorites are the building blocks of the planets; they provide clues to the geological history of asteroids; they may have delivered raw materials (i.e., water, organics, phosphorus) to the early Earth, facilitating the origin of life; collisions of asteroids with the Earth changed the course of evolution and Martian meteorites allow us to study the history of Mars - same with lunar meteorites, they help us understand geology of our moon.



There are different types of meteorites: Chondrites (primitive, unmelted meteorites) and Differentiated (which were totally melted). Our focus is on chondrites. The different chondrite groups include **R** (Rumuruti), **Ordinary** (H, L and LL), **Carbonaceous** (CB, CK, CI, CM, CV, CO, CR and CH) and **Enstatite** (EH and EL) chondrites. Dr. Rubin displayed data showing size in micrometers ( $\mu\text{m}$ ), % with enveloping compound chondrules, % with igneous rims, thickness of those rims, abundance of fine-grained matrix in the rock and other stats. The largest are in the CV (910 $\mu\text{m}$ ) and CR (700 $\mu\text{m}$ ) groups with thickness of igneous rims at 250 $\mu\text{m}$  and 270 $\mu\text{m}$ , respectively. He tells us the average chondrule peak temperature is 1630°C and may range 1480-1880°C. The primitive, undifferentiated meteorites, the chondrites, have metal and silicate grains mixed together. The photo he showed identifies light colored metallic Fe, Ni and the dark colored areas as silicate. They are derived from asteroids that never experienced global melting! [Secy Note: Some examples of meteorites include: Semarkona (fell in India 1940) is Ordinary, Allende (fell in Mexico in 1969) is Carbonaceous and Sikhole-Alin (fell in Russia in 1947) is Iron.]

“Chondritic meteorites have the same composition of condensable elements as the Sun. They are made out of the same stuff that formed the Sun and planets (minus H and He). If you took away all the H and He from the Sun, shrinking it so the remaining husk would weigh only 2% as much, it would still be >6,000 times as massive as the Earth. And it would have a chondritic composition.” Dr. Rubin went on to explain about elements with higher concentrations in the Sun than in chondrites and that the undifferentiated meteorites are the chondrites that derive their name from the sub-millimeter size igneous spheroids. Nearly all chondrites contain chondrules.

Dr. Rubin says that chondrules were first mentioned in a paper referencing: “... experiments and observations on certain stony and metalline substances, which at different times are said to have fallen on Earth; also various kinds of native iron”, by Edward Howard, John Lloyd Williams and Count de Bournon (circa 1802).

Chondrites with big chondrules seem to have formed in dusty environments. Dust clumps may have been formed by electrostatic clumping or by gas-drag-induced concentration of dust in local high-pressure regions of the nebula. There is evidence; Dr. Rubin displayed several slides to that effect. In fact, there are igneous rims around chondrules; secondary shells enveloping compound chondrules. Chondrules that formed in dusty environments tended to lose volatiles such as S and Na. Repetitive remelting of chondrules in a *dust-rich* environment would tend to produce *large* chondrules, many with thick igneous rims and abundant enveloping compound chondrules. Whereas, remelting in a *dust-poor* environment produce *small* chondrules which would tend to have only a few thin igneous rims; enveloping compound chondrules would be relatively rare.

Additionally, chondrules that formed in dusty environments would have cooled more slowly because their mantles would have absorbed heat radiated from the enclosed chondrules. Metal and sulfide could have migrated toward the surface. Sulfur would have evaporated, leaving abundant low Ni metallic Fe. Surface tension caused the metal to form beads (spheroids) – very common in CR chondrules. In contrast, sulfide-bearing chondrules are relatively rare.

There are radial pyroxene chondrules that formed by complete melting of their precursor assemblages; and porphyritic chondrules formed when there are lots of nuclei in the melt. Dr. Rubin showed several graphs measuring composition against chondrule diameters. He explained Rhian Jones’ profiles study in FeO-rich chondrules in Semarkona (meteorite that fell in India 1940) and went on to say that certain conclusions were incorrect. Further diagrams and slides show that it is possible that chondrule olivine grains experienced multiple heating events; but what is needed to illustrate chondrule thermal histories is the element that diffuses slowly within olivine. That would be phosphorus. Some experiments were done on a grain (H5k-1) showing remelting and fragmentation and on another grain (B2i-1). Complex analysis with regard to oscillatory patterns, P-rich zones, crystallization after super cooling and slow cooling all provided information for further research into the matter (literally).

Chondrules preserve petrographic features reflecting quenching from high temperatures. They contain skeletal olivine grains surrounded by glassy mesostasis: (a) some olivine grains have hopper morphologies resembling prismatic form of complete olivine crystals and (b) some olivine grains have dendritic, feathery morphologies indicative of extremely rapid cooling. Chondrule mesostases are feldspathic glass. Feldspathic glass + annealing (heating cycle) = plagioclase. [*Secy Note: mesostasis is the very last state in the formation of igneous rock.*]

Rubin (aka Zeus, you had to see the presentation slide) continues with nebular lightning and the separation of particles by size and charge separation. He says turbulence affects finer particles. Small particles tend to acquire negative charge while larger particles tend to acquire positive charge. Dr. Rubin concludes by stating that lightning, it seems, is a viable mechanism for forming chondrules in the nebula.

Wow! This jam-packed presentation was a gift to our society with fabulous photos, graphs, and fun graphics. There was a wonderful Q&A session with lots of questions and discussion. In fact, the Q&A continued after the formal adjournment.

Thank you, Dr. Alan Rubin, for another interesting presentation. By the way, the UCLA Meteorite Gallery has re-opened. Check UCLA’s website for details.

Please join us at the **next ZOOM Membership meeting, October 8, 2021**. The scheduled presenter will be Dr. Sarah Milkovich; she will speak about "MARS".

As there was no other society business, the meeting was adjourned by Dr. Rossman at 8:51 p.m.

Respectfully submitted, Angie Guzman, MSSC Secretary

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### List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
<b>Meeting Dates:</b>	<b>ZOOM</b> November 12, 2021	Paolo Sanchez, UC Berkeley, Geology & Geophysics ' 22 -Important Minerals You Probably Never Heard Of
	<b>ZOOM</b> December 10, 2021	Dr. George Rossman TBA
	<b>ZOOM</b> January 14, 2022	Denise Nelson: TBA
	<b>ZOOM</b> February 11, 2022	MIKO: A brief Introduction to Indonesian Gemstones
<b>Board Meeting</b>	<b>ZOOM</b> October 24, 2021	ZOOM
<b>Field Trip</b>	October 16 & 17, 2021	Cady Mountains

*Note: Dates and programs shown above are subject to change. Check your bulletins to confirm final information each month.*

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### \*\*\* ELECTION NOTICE \*\*\*

- **Nominations** for all MSSC Officers and 2 Director seats will be accepted at the **October 8, 2021** Membership Meeting.
- Additional Nominations, and then the **Election of Officers and 2 Director seats** will be held at the **November 12, 2021** Membership Meeting.

If you would like to run for a corporate office or a Director seat, please check your Bylaws and Operating Rules and Regulations for information. Kindly contact any Board member via e-mail if you have questions or comments about the upcoming elections.

Thank you, Angie Guzman, MSSC Secretary [secretary@mineralsocal.org](mailto:secretary@mineralsocal.org)

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### Field Trip Information: Marek Chorazewicz

We have a field trip to the Cady Mountains on our upcoming events list.. If you are interested please contact me at [marek.chorazewicz@keysight.com](mailto:marek.chorazewicz@keysight.com)

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### In Memoriam, William Stewart (Bill) Wise August 18, 1933 – June 29, 2021

Bill passed away this past June after a long bout with cancer. He discovered his life's passion, geology, while in the Boy Scouts when he was 14. attended Stanford University for his Bachelor's degree, then went on to Johns Hopkins University in Baltimore for his Ph D. where he focused on Volcanology and Mineralogy. He accepted a teaching position at UCSB and was there from 1961 to 1994 as a professor researcher, department head and associate Dean of Letters and Science. Teaching field courses in geology was a big part of his life while there.

After he retired from UCSB, he spent time volunteering at the Humane Society socializing dogs for adoption. He also adopted old dogs who needed a loving home. Another strong interest was collecting Chinese stamps.

He was interred at the Goleta Cemetery.

Fred & I knew him thru his membership in MSSC and the Northern California Micromounters Association. He will be missed. –Linda Elsnau



## **Ride Share Listing**

### **Can You Provide A Ride?**

### **Would You Like Company On The Drive To Meetings?**

We have heard from several of our members that they would like to ride-share with someone to the meetings. We will list the names, general location and either a phone number or an email address of anyone who would like to connect for a ride-share. If you would like to catch a ride or would like company for the trip, let me know at [msscbulletin@earthlink.net](mailto:msscbulletin@earthlink.net) and I'll put the information in this section of the bulletin. After that, any final arrangements made are up to you. Also, If you make a connection that works for you, let me know so that I can remove your information from the bulletin. The Editor

Looking for	Who	Where	Contact at
A ride	Richard Stamberg		<i>Meetings cancelled due to Covid</i>

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### **OTHER FREE THINGS TO DO...by Ann Meister**

The **Von Kármán Lecture** is on Thursday, **October 14** at 7:00 PM. Available live on YouTube at [The Warm Glow of our Cool Universe \(Live Public Talk\) - YouTube](#). The speakers are Dida Markovic, Research Scientist, NASA/JPL and Phil Korngut, Research Scientist, Caltech, SPHEREx instrument scientist. The title of the presentation is “**The Warm Glow of our Cool Universe.**” In order to explore the mysteries of our universe, we need to look at it in different ways. Astrophysics missions like SPHEREx and Euclid will use infrared astronomy to deepen our knowledge of unseen phenomena, such as inflation and dark matter. Join us as we explore how infrared observations are changing our understanding of the cosmos and its origins.

The **Watson Lecture** is on Wednesday, **October 20**. Each Watson Lecture will begin at 5:00 p.m. Pacific Time. Each lecture runs approximately 40 minutes, followed by live audience Q&A. Advance registration is required: [Watson Lecture - Megasupramolecules: From Disaster to Discovery Tickets, Wed, Oct 20, 2021 at 5:00 PM | Eventbrite](#). The speaker is Julia A. Kornfield, Professor of Chemical Engineering at Caltech. The title of the presentation is, “**Megasupramolecules: From Disaster to Discovery.**” The events of 9/11 spurred Kornfield's research team to begin researching polymers that, when added to fuels like gasoline, minimize the risk of explosion when ignited. These polymers, known as megasupramolecules, change the way liquid fuels flow and could help reduce fatalities and injuries from plane crashes, auto accidents, and IED attacks on the battlefield. Find more past Watson Lectures on [Caltech's YouTube channel](#).

The **UCLA Meteorite Gallery** has reopened. Check the website for hours. The monthly lecture will be presented on Zoom on Sunday, **October 17** at 2:30 PM. Speaker and topic are not yet available. **Zoom Registration:** [https://ucla.zoom.us/meeting/register/tJEqduyupj0vGd3S0\\_52FsHTbPjYr0sZQUj](https://ucla.zoom.us/meeting/register/tJEqduyupj0vGd3S0_52FsHTbPjYr0sZQUj) If you need detailed instructions on [how to join a meeting](#) via Zoom please contact our Curatorial Assistant, Juliet Hook, at [jahook@ucla.edu](mailto:jahook@ucla.edu). Note: Registration is needed only once as this is a recurring meeting in Zoom. The speaker and topic will be announced on the website. Visit the website and check on events and videos and other neat things about meteorites, go to <https://meteorites.ucla.edu>

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*With Knowledge Comes Appreciation!*

<b>MSSC Advertisement Policy:</b> Mineral-related ads are allowable in the MSSC bulletin. Below is the price per month			
	Business Card	\$5.00	
	1/3 page	\$10.00	
	1/2 page	\$20.00	
	Full Page	\$35.00	
In addition, any advertiser who purchases 12 months of space in advance will receive a discount of 12 months for the price of 10 months. The copy for the ads should be mailed to the editor at <a href="mailto:bulletin@mineralsocal.org">bulletin@mineralsocal.org</a> and the payment should be sent to the <b>MSSC Treasurer 13781 Alderwood Lane, #22-J, Seal Beach, CA 90740</b>			

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## Calendar of Events:

Only local area shows are listed here. Other CFMS Club shows can be found at: <http://www.cfmsinc.org/>

**Due to COVID-19 many clubs have cancelled or changed their show dates. CFMS updates this list if clubs notify them. If you have any questions, please reach out to the contact listed to make sure the show is still taking place.**

### October 1-3, 2021 – Vista, CA

Vista Gem and Mineral Society  
Vista Gem and Mineral Open-Air Market  
Antique Gas and Steam Engine Museum, 2040 N.  
Santa Fe Ave., Vista CA 92083  
Friday and Saturday 10 AM – 5 PM, Sunday 10 AM  
– 4 PM  
Website: <http://www.vistarocks.org>

### October 8, 9, 10 & 11, 2021, Clovis CA

Fresno Gem & Mineral Society  
Clovis Rodeo Grounds, 445 Clovis, CA 93613  
Time: Friday-Sunday Oct. 8th-10th – 10 AM – 5 PM,  
Monday Oct. 11th – 10 AM – 4 PM  
Website: <http://www.fgms.us/>

### October 10, 2021 – Fallbrook, CA

Fallbrook Gem and Mineral Society  
Fall Festival of Gems  
Location: Across the street from the Fallbrook Gem  
and Mineral Museum, 123 W. Alvarado St.,  
Fallbrook, CA in the parking lot.  
October 10th, 9 AM – 4 PM

### November 6-7, 2021 – Ridgecrest, CA

Indian Wells Gem & Mineral Society, Inc.  
Desert Empire Fairgrounds, 520 S. Richmond Rd.,  
Ridgecrest CA 93555  
Time: Saturday & Sunday 9 AM – 5 PM  
Fieldtrip November 7th at 9 AM

### November 20-21, 2021 – Lake Side, CA

El Cajon Valley Gem and Mineral Society  
Lakeside Rodeo Grounds, 12584 Mapleview St.,  
Lakeside, CA 92040  
Time: Saturday 9 AM – 5 PM, Sunday 9 AM – 4 PM  
Free admission and parking.  
Website: <http://ecvgms.org>

### December 5, 2021 – Lake Elsinore, CA

Lake Elsinore Gem & Mineral Society  
Rock 'n Craft Winter Festival, 32097 Corydon Rd.,  
Lake Elsinore, CA 92530  
Hours: Sunday, December 5 – 10 AM – 4 PM  
Website: Facebook: Lake Elsinore Gem & Mineral  
Society

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***With Knowledge Comes Appreciation !***

## 2021 MSSC Officers:

<b>OFFICERS</b>		
President	George Rossman	<a href="mailto:president@mineralsocal.org">president@mineralsocal.org</a>
Vice President	Ahni Dodge	<a href="mailto:vicepresident@mineralsocal.org">vicepresident@mineralsocal.org</a>
Secretary	Angie Guzman	<a href="mailto:secretary@mineralsocal.org">secretary@mineralsocal.org</a>
Treasurer	Carolyn Seitz	<a href="mailto:treasurer@mineralsocal.org">treasurer@mineralsocal.org</a>
CFMS Director	Angie Guzman	
Past President	Ann Meister	
<b>DIRECTORS</b>		
2020-2021	Pat Caplette	
2020-2021	Cheryl Lopez	
2021--2022	Rudy Lopez	
2021--2022	Pat Stevens	
2021--2022	Leslie Ogg	
<b>COMMITTEE CHAIRS</b>		
Bulletin Editor	Linda Elsnau	<a href="mailto:bulletin@mineralsocal.org">bulletin@mineralsocal.org</a>
Field Trip	Marek Chorazewicz	
Historian	Ann Meister	
Hospitality	Laura Davis	
Membership	Cheryl Lopez	<a href="mailto:membership@mineralsocal.org">membership@mineralsocal.org</a>
Micro Mount Conf. Chairman	Al Wilkins	
Program and Education	Rudy Lopez	<a href="mailto:programs@mineralsocal.org">programs@mineralsocal.org</a>
Webmaster	Leslie Ogg	<a href="mailto:webmaster@mineralsocal.org">webmaster@mineralsocal.org</a>

### About the Mineralogical Society of Southern California

Organized in 1931, the Mineralogical Society of Southern California, Inc. is the oldest mineralogical society in the western United States. The MSSC is a member of the California Federation of Mineralogical Societies, and is dedicated to the dissemination of general knowledge of the mineralogical and related earth sciences through the study of mineral specimens. The MSSC is a scientific non-profit organization that actively supports the geology department at Pasadena City College, Pasadena, California. Support is also given to the Los Angeles and San Bernardino County Museums of Natural History. The Bulletin of the Mineralogical Society of Southern California is the official publication of the Mineralogical Society of Southern California, Inc.

The MSSC meetings are usually held the second Friday of each month, January, February and August excepted, at 7:30 p.m. in Building E, Room 220, Pasadena City College, 1570 E Colorado Boulevard, Pasadena, California. The annual Installation Banquet is held in January, and the annual Picnic and Swap Meeting is held in August. Due to PCC holidays, meetings may vary. Check the Society website for details.

The Society also sponsors the annual Pacific Micro mount Symposium held at the Fallbrook Mineral Museum during the last weekend of January.

Annual Membership dues for the MSSC are \$20.00 for an individual membership, \$30.00 for a family membership. Bulletins are delivered by email, there is an additional annual fee if you prefer paper bulletins mailed to your address. The Society's contact information:

**Mineralogical Society of Southern California**

**13781 Alderwood Lane, #22-J, Seal Beach, CA 90740**

**E-mail:** [treasurer@mineralsocal.org](mailto:treasurer@mineralsocal.org)

**Website:** [www.mineralsocal.org](http://www.mineralsocal.org) **The Mineralogical Society of California, Inc.**

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MSSC Bulletin Editor  
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Glendale, CA 91214-2415

*To:*



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Appreciation**

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Bulletin Is  
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