Bulletin of the Mineralogical Society of Southern California

Volume 94 Number 2 - February, 2021

The 986th meeting of the Mineralogical Society of Southern California

With Knowledge Comes Appreciation

A ZOOM Meeting

February 12th, 2021 at 7:30 P.M.

Program : **The Journey from an Unknown to a New Mineral**
Presented by Dr. Anthony R. Kampf

In this Issue:

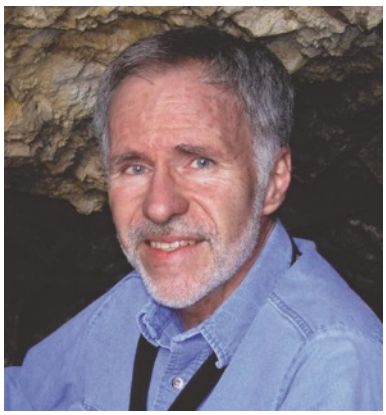
Remember: If you change your email or street address, you must let the MSSC Editor and Membership Chair know or we cannot guarantee receipt of future Bulletins

MSSC Membership Dues: **February 20, 2021** is the Date!!

Your membership dues will need to be paid before Feb. 20, 2021, if your information is to be listed in the Annual Roster and to continue to receive the MSSC Monthly Bulletin.

About the Program: The Journey from an Unknown to a New Mineral

Presented by Dr. Anthony R. Kampf



There are now more than 5600 known mineral species and that number is growing by more than 100 each year. The long-held notion that there is a limit to the number of mineral species does not account for the existence of exotic geologic and geochemical environments (some extraterrestrial), which continue to come to light and others that have only recently been explored. Mineralogy books tell us about some of the basic tests (streak, hardness, cleavage, density, etc.) that can be used to identify a mineral; while such properties are important in characterizing minerals, they have limited usefulness when it comes to unambiguously identifying an exotic phase, or determining that it is a new mineral. Tony Kampf will lead us on the journey from the finding of an unknown mineral through its description as something new to Science – a journey that he has now taken more times than anyone else in the world.

Dr. Anthony (Tony) R. Kampf discovered mineralogy and crystallography as an undergraduate chemistry major at the University of Illinois in Chicago. He received his B.S. in chemistry (1970) and his M.S. in mineralogy and crystallography (1972) from that institution. He continued his studies at the University of Chicago under the mentorship of the inimitable Prof. Paul Brian Moore who introduced Tony to the thrill of discovering and characterizing new minerals, using both classical and modern techniques. After receiving his Ph.D. in mineralogy and crystallography in 1976, Tony joined the staff of the Natural History Museum of Los Angeles County at the beginning of 1977. He has spent his entire 44-year professional career at the museum, serving more than 34 years as Curator(including 31 as head of the Mineral Sciences Department) and the past 10 years as Curator Emeritus. Tony has more than 450 publications and has authored the descriptions of 289 minerals (more than anyone else).Since 2008, he has served as the U.S. delegate to the International Mineralogical Association's Commission on New Minerals, Nomenclature and Classifications.

How to Participate in MSSC ZOOM meetings:

Program Chair, Rudy Lopez, will send an email invitation each month to our ZOOM Invitation List.

If this is your first time to join our ZOOM meeting:

If you want to participate in our ZOOM meetings, please check out the information in the MSSC website/Bulletin www.mineralsocal.org , send an email to programs@mineralsocal.org by Tuesday, February 9th. Include "February ZOOM" in the Subject. Rudy will make sure you are contacted.

Effective March 21, 2021---SPECIAL ZOOM MEETING NOTICE

MSSC's current ZOOM Invite list is over 80. We averaged 40 – 50 participants for the past 3 months.

Effective: March 21, 2021 we will delete our current ZOOM list.

If you want to continue participating in future MSSC ZOOM meetings you must send an email to Rudy Lopez at programs@mineralsocal.org. **Subject:** Please add me to the new ZOOM meeting's invite list. Thank you, Rudy Lopez.

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From the Editor:

I hope everyone is safe and healthy as we enter the beginning of the 2021 Tax season. It appears we are also entering the 2021 vaccination period. As Fred & I are still trying to get an appointment for ours, I hope success for one and all in booking your turn.

It looks like another excellent program for this month. Our Program Chair is doing a lot of work to find and book our excellent speakers every month. Thank you Rudy. Thank you to all of our hardworking officers who work so hard to keep MSSC ticking on.

Linda Elsnau

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FROM THE PRESIDENT: Interesting Minerals, A to Z. Round 2, installment 11, the letter "K": by George Rossman

Kyanite Al_2SiO_5

Kyanite was first named in 1789 by Abraham Gottlieb Werner who took the name from the Greek word κύανος (kyanos in English), meaning "blue," the common color of the species. However, the French spelling, "Cyanite", was commonly used by mineralogists through much of the 19th and early 20th centuries. In his publication:

> Hoffmann C.A.S. (1789) Mineralsystem des Herrn Inspektor Werners mit dessen Erlaubnis herausgegeben von C A S Hoffmann. Bergamaschi Journal 1, 369-398.

It was his mineral # 63 was called cianit, 63) Cianit. , today known as kyanite.

By the early 1800's the spelling 'kyanit' was appearing in the literature.

> **Klaproth, Martin H.** (1810) *Chemische Untersuchung des Kyanits, Beiträge zur chemischen Kenntniss der Mineralkörper,* Fünfter Band, Rottmann Berlin, 6-11.

Kyanite's International Mineralogical Association status is "Approved", 'Grandfathered' (first described prior to 1959).

Kyanite typically forms during the large-scale metamorphism of sediments that are rich in clay minerals. Such transformations require a significant depth of burial where the pressure exceeds 4,000 atmospheres of pressure. It is usually found in gneisses and schists, although it can occasionally be found in granites.

A distinctive property of many kyanites is their rich, dark-blue color **(Figures 1-3)**

Figure 1. Kyanite from the Central St Gotthard Massif, Ticino, Switzerland Photo Credit: Rob Lavinsky & irocks.com

Figure 2. Kyanite from the Biaxo Guandu, Minas Gerais, Brazil Photo credit: Mark Garcia

Figure 3. Kyanite from the Alpe Sponda Mountains, Switzerland. Photo credit: Mark Garcia

But, the blue color is not mandatory. If kyanite contained only Al, Si and oxygen, it would be colorless. **Figure 4** shows a very pale kyanite and **Figure 5** shows an essentially colorless kyanite from the kyanite deposit near Ogilby in the southeast part of California.

Figure 4. Pale colored kyanite from Crowder Mt, Gaston Co, NC. Photo credit: Mark Garcia

Figure 5. Near-colorless kyanite from Ogilby, Imperial Co, CA Photo Credit: Mark Garcia.

Other colors are possible. **Figure 6** shows a different shade of blue in kyanite from Ogilby.

Figure 5. A different shade of blue kyanite from Ogilby, Imperial Co, CA Photo Credit: Mark Garcia.

Figure 6. Greenish kyanite from Capelinha, Minas Gerais, Brazil Photo Credit: Mark Garcia.

So, why is kyanite blue? The reason has to do with the fact that kyanite commonly contains minor amounts of iron and titanium. Iron can replace a small amount of the aluminum. It enters in the 3+ oxidation state. The iron will cause a yellowish-green color if it is the only other cation present. Iron can also enter kyanite in the 2+ oxidation state, compensated to make charge balance, at least in part, by the co-incorporation of titanium in the 4+ oxidation state. This gives rise to the process we have previously described: Intervalence Charge Transfer. In kyanite, two intervalence pairs exist in which electrons can be exchanged between Fe^{2+} and Fe^{3+} and between Fe^{2+} and Ti^{4+}. These processes are very efficient at absorbing light, so just a fraction of a weight percent of these elements can cause a significant amount of color in kyanite. The exact shade of blue will depend upon the exact proportion of these two processes in a particular sample of kyanite.

A distinctive feature of many kyanites is the blue streak down the center of the crystal **(Figure 7),** the only part of the crystal that contains titanium in any significant amount.

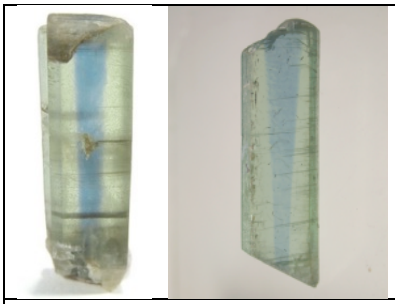

Figure 7. Kyanites from Bahia (left) and Minas Gerais (right), Brazil. Photo credits: Rob Lavinsky and GRR

Figure 8. Kyanite containing chromium 3+ from the Roberts Victor kimberlite, South Africa. GRR photo

There is another way to get blue kyanites. To do this, you will need to get your samples from a diamond mine. Many kimberlites bring up kyanites that are blue colored due to their content of chromium in the 3+ oxidation state **(Figure 8).** In these samples, the chromium replaces a small amount of the aluminum.

While blue kyanite was known for a long time, only more recently a different color has become available from localities in Tanzania, namely, orange kyanite from Matia Hill in the Dodoma region and Nani in the Arusha region **(Figure 9).** This variety of kyanite contains manganese in the 3+ oxidation state that gives it the orange color (Chadwick & Rossman, 2009).

Figure 9. Orange kyanite from Nani, Loliondo, Tanzania, that contains Mn^{3+}. GRR photo

Chadwick KM, Rossman GR (2009) Orange kyanite from Tanzania. Gems & Gemology 45, 146-147.

Kyanite has a number of properties that vary with the direction in which they are measured. The color of blue kyanite is one. Light polarized close to the c-axis is much more strongly absorbed.

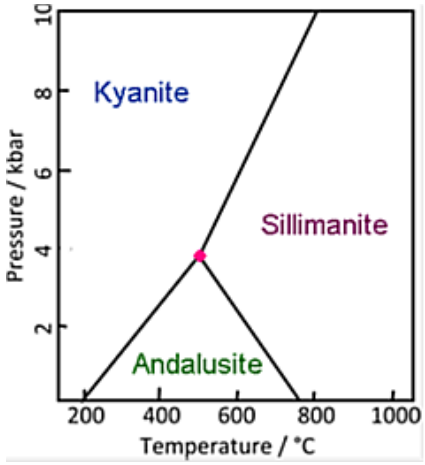

Figure 10. The aluminosilicate phase diagram modified from Whitney DL (2002) American Mineralogist 87, 405-516.

than light polarized in the perpendicular direction. An even more interesting directional property is the Mohs hardiness of the mineral. The hardness measured by scratching parallel to the *a*-axis is 7 whereas the hardness measured by scratching parallel to the *c*-axis is 5.5. The hardness difference can be used as a key to the identification of a specimen.

Kyanite is one of three common aluminosilicate phases. The others are andalusite and sillimanite. Each of these phases has its own ecosystem of pressure and temperature in which it exists. The experimental petrology community has studied these phase relations in great detail and has worked out the conditions under which each of them can exist as shown in **Figure 10,** a PT diagram modified from the diagram in Whitney (2002).

Whitney DL (2002) Coexisting andalusite, kyanite, and sillimanite: Sequential formation of three Al_2SiO_5 polymorphs during progressive metamorphism near the triple point, Sivrihisar, Turkey. American Mineralogist 87, 405-516.

If a rock is found where all three of these phases simultaneously exist in contact with each other, Figure 10 shows exactly the single temperature and pressure at which that rock had to form, a PT region known as the triple point (the red dot in the diagram where all three phases meet).

Kyanite is mined commercially because it is used primarily in a variety of refractory and ceramic products. These products generally have good thermal shock resistance. It is added to potter's clay and gives strength to the clay bodies before firing. Common items such as porcelain plumbing and some types of dishware use kyanite in their production. Kyanite is also used in the manufacture of a variety of electronic applications where it makes strong and effective ceramic electrical insulators. When fired to a high temperature, kyanite transforms into mullite, $Al_6Si_2O_{13}$, which helps sinter the ceramic and reduces the shrinkage that occurs during firing clays without added kyanite.

Oh yes, one more use of kyanite. Transparent crystals can be faceted into a gemstone for those who collect exotic gems **(Figure 11).** They are rather pretty, they are.

Figure 11. A 7.66 carat gem kyanite
Photo credit: Pala International

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MINUTES of the January 8, 2021 ZOOM Meeting

MSSC's 985th Membership Meeting was held on January 8, 2021 and was opened at 7:30 pm by President, Dr. George Rossman, Ph.D. Dr. Rossman thanked Caltech for allowing us to use their ZOOM license for our meeting.

Minutes of the December 2020 Membership Meeting were approved and seconded.

Ann Meister announced that there will be a virtual Rock and Gem Show from Tucson February 14, 2021. Visit the active website at **https://therock.show** for more information. There will be dealers from around the world wanting to show you what they have.

Rudy Lopez will have a rock/slab give away on Saturday, January 16, 2021 from 9-12 am. First come, first served. Watch for his e-mail for information and address.

Program Chair Rudy Lopez introduced Denise Nelson who gave a talk "30 Years of Appraisal Adventures."

Denise started in the jewelry business for 5 years and then began the next 30 years in the appraisal business. There are 3 types of appraisal: (1) Estate appraisal is based on the value given by a willing buyer and a willing seller, (2) Insurance appraisal is higher because it is the replacement cost, tax, cost of claim paperwork, etc. and (3) Internal Revenue Service appraisal which is the lowest value given. This method is approved by the IRS.

There were many pictures and stories with each picture in Denise's presentation. Provenance is necessary for higher value. The more information you can give the appraiser the better. The weight of the gems, where the minerals came from, who designed and made the jewelry, any history of the piece. Trade Shows, eBay, museums, etc. are good places to get a feel for the value of an item. Dealers are very helpful in valuing minerals.

One of her maxims is the closer you get to a mine, the more it costs. For example, near a diamond mine she was offered synthetic diamonds. But in Thailand near the Burma border, she was offered a handful of real rubies that she now wishes she'd bought.

Thanks, Denise, for another wonderful presentation!

Meeting was adjourned at 8:54pm.

Submitted by Jo Anna Ritchey

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MSSC EMBROIDERED PATCH

We are selling MSSC embroidered patches.
The patches are 3"x 3".
If you want to purchase a patch and have it mailed to you.

The price is $12.00

If interested please send a check to.

MSSC
1301 Leonard Ave.
Pasadena CA. 91107

List of Upcoming MSSC Events : Mark your Calender!

Event	Date	Comments / Scheduled Program (if known)
Meeting Dates:	**ZOOM** March 12, 2021	John Rakovan: New insights into the structure and formation of wire silver and gold.
	ZOOM April 9, 2021	Krista Sawchuk: Discovering the Deep Earth
	ZOOM May 14, 2021	Howard Heitner: The Tilly Foster Mine, A Classic Mineral Locality
	ZOOM June 11, 2021	Peter Goetz: - Beautiful Opal, Identification and Internet Opal
Board Meeting	TBA	Via ZOOM
Field Trip	TBA	TBA

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

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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 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	North Orange County, near Cal State Fullerton	*Meetings canceled due to COVID-19*

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Reminder: **Your Membership Dues need to be paid before February 20, 2021 to maintain your MSSC Membership, to have your information listed in the Roster and to continue receiving your MSSC Bulletin.**

Dues are Due February 20, 2021

Don't delay or forget…do it now!
Your 2021 Membership form was included as page 13 of your November, 2020 Bulletin.

Detach/Print your form, fill it out and mail it with your check today!

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OTHER (FREE) THINGS TO DO... by Ann Meister

The Von Kármán Lecture on Thursday, **February 4** at 7:00 PM. The event is live on Ustream. http://www.ustream.tv/nasajpl2 Check online for changes and other viewing options at von Kármán Lecture Series (nasa.gov) The speaker is Dr Moogega Cooper, Planetary Protection Lead, Mars 2020, NASA/JPL. The

title of the presentation is **"Planetary Protection."** Protecting the Earth from the scum of the universe... and the universe from the scum of Earth. We chat with Moogega Cooper (Mars 2020, Europa Clipper) about preventing contamination during missions around the solar system and making sure they don't bring anything dangerous back with them.

The Watson Lecture is on Wednesday, **February 17**, at 5 PM Zoom online with a live audience Q&A at the end. At 8 PM the recorded lecture (without Q&A) will be posted on Caltech's YouTube channel https://www.youtube.com/user/caltech. You must register in advance for Zoom at Webinar Registration - Zoom. The speaker is Mansi Kasliwal, Assistant Professor of Astronomy at Caltech. The title of the presentation is, **"What Cosmic Fireworks Unveil About the Universe."** Our dynamic universe is ablaze with cosmic fireworks. Stars explode and send out beacons of light that are a million to a billion times brighter than our sun. Fireworks generated in these explosions are what synthesize most of the elements in our periodic table: while some explosions, called supernovae, create the lighter elements, mergers involving compact stars, called neutron stars, synthesize half of the elements in the periodic table that are heavier than iron.
In her lecture, Kasliwal will explain how astronomers discover these cosmic fireworks with robotic telescopes and how they have undertaken a global follow-up campaign to characterize these energetic and ephemeral events. She will also discuss how astronomers combine information from multiple cosmic messengers—light, neutrinos, and gravitational waves—to gain a more comprehensive understanding of our universe. For online stuff at Caltech go to http://events.caltech.edu/

The **UCLA Meteorite Gallery** is temporarily closed until further notice. The website does not show a lecture for February at this time. 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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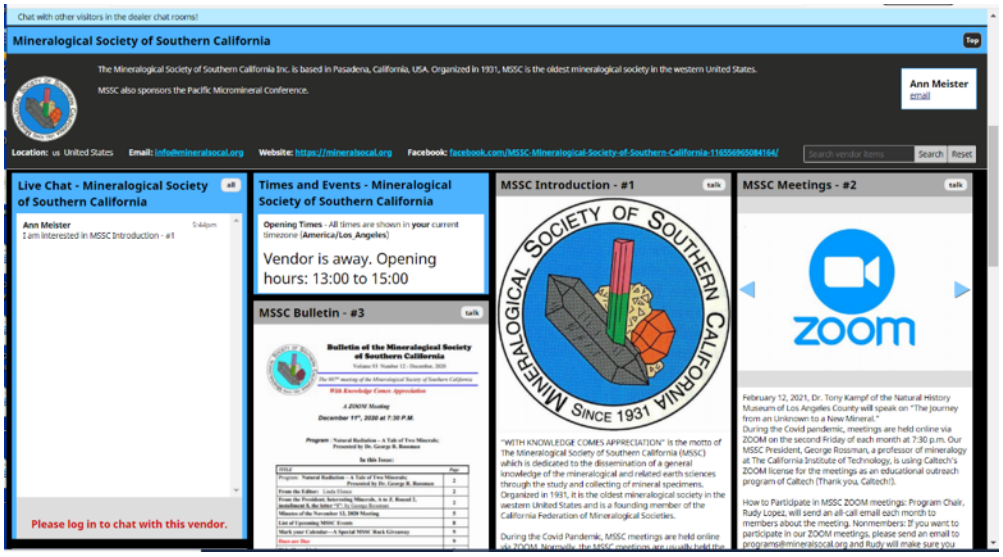
THE VIRTUAL TUCSON EXPERIENCE OPENING JANUARY 30

MSSC has a booth at TheRock.Show. It's in the Mineral Organizations Room in The Mineral Show. Check it out!

And check out all the dealers and more in each of the nine shows. The Mineral Show covers mineral specimens, lapidary, and tools for collectors at



every level of the hobby. Then there's The Masterpiece Show for the best of the best – fine collector minerals, outstanding unique gemstones, and the best carvings – along with other treasures. There's The Fossil Show, The Meteorite Show, The Jewelry Show, The Gemstone Show, The Bead Show, The Metaphysical Show, and The Wholesale Show. All of what we expect at Tucson! There're dealers that you know but what's nice is that there will be dealers that don't normally go to Tucson because of the hassle. So, you'll get a chance to see stuff you don't usually get a chance to see. All the more fun. The show is open 24/7 so you can see a dealer's inventory and leave messages on Live Chat. Some booths may also have live ZOOM shows or other activities such as lectures or classes. Lot's to see. TheRock.Show opens to the public on January 30, 2021. Go to https://TheRock.Show

MSSC Advertisement Policy:
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 bulletin@mineralsocal.org and the payment should be sent to the

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

With Knowledge Comes Appreciation !

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.

June 12-13, 2021, Escondido CA
Palomar Gem and Mineral Club
340 N. Escondido Blvd., Escondido CA 92025
Saturday – 10 AM – 5 PM, Sunday 10 AM-4PM
30-35 dealers.
Website: pgmcshow@palomargem.org

June 25, 26 & 27, 2021
CFMS 2021 Gem, Mineral & Jewelry Festival
Lodi Grape Festival & Harvest Fair
413 E. Lockeford St., Lodi, CA
Adults: $8, 12 and under: Free
10AM-5PM Fri & Sat, 10AM-4PM Sun
www.cfmsinc.org rocksbob@sbcglogal.net

August 14-15, 2021 – Arcadia CA
Pasadena Lapidary Society
Arcadia Masonic Center, 50 W. Duarte Rd., Arcadia
Hours: 10-5 Daily
Website: pasadenalapidary.org

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February Featured Mineral: Diaspore

Formula: **AlO(OH)**

Crystal System: Orthorhombic

Name: Named in 1801 by Abbé Rene Just Haüy from the Greek διασπείρευ, to scatter, in allusion to the usual decrepitaton in the blowpipe flame.

© *Irocks*

Diaspore
AlO(OH)
Locality: Möng Hsu, Loilen District, Shan State, Myanmar
0.9 cm x 0.5 cm x 0.1 cm

© *Irocks*

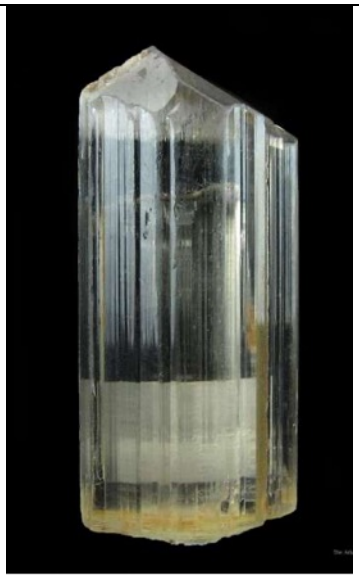
Diaspore
AlO(OH)
Locality: Möng Hsu, Loilen District, Shan State, Myanmar
1.3 cm x 0.9 cm x 0.1 cm

© *Irocks*

Diaspore (*Var*: Mangan-diaspore)
AlO(OH)
Locality: Wessels Mine, Hotazel, Kalahari manganese field, Northern Cape, South Africa
6.9 cm x 5.7 cm x 4.9 cm

© *Irocks*

Diaspore
AlO(OH)
Locality: Selçuk District, Izmir Province, Turkey
3.6 cm x 3.6 cm x 2.6 cm



© *Irocks*

Diaspore
AlO(OH)
Locality: Selçuk District, Izmir Province, Turkey
2.8 cm x 1.2 cm x 0.35 cm

© *Irocks*

Diaspore
AlO(OH)
Locality: Muğla Province, Turkey
3.6 cm x 0.9 cm x 0.6 cm

Orthorombic Crystal System:

3 Axes, all at right angles but all of different lengths. *Ortho* = All Right Angles

2021 MSSC Officers:

OFFICERS		
President	George Rossman	*president@mineralsocal.org*
Vice President	Ahni Dodge	*vicepresident@mineralsocal.org*
Secretary	Angie Guzman	*secretary@mineralsocal.org*
Treasurer	Carolyn Seitz	*treasurer@mineralsocal.org*
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Past President	Ann Meister	
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2021--2022	Rudy Lopez	
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2021--2022	Leslie Ogg	
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Micro Mount Conf. Chairman	Al Wilkins	
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Webmaster	Leslie Ogg	*webmaster@mineralsocal.org*

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 San Bernardino County Natural History 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 $20.00 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***

Website: ***www.mineralsocal.org*** **The Mineralogical Society of California, Inc.**

MSSC Bulletin Editor

3630 Encinal Ave.

Glendale, CA 91214-2415

To:

With Knowledge Comes Appreciation

Your MSSC Bulletin Is Here!