



OUTCROPPINGS

March 2021

www.semml.com

Incorporated April 8, 1970

**Meetings held on the second Thursday of each month at 7:30pm (excluding July and August)
in Room 130 of the Conant Science Building at Bridgewater State University,
14 Park St., Bridgewater, MA**

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March 2021 SEMML Meeting will be held on ZOOM

Due to the COVID-19 pandemic, SEMML will be holding our regular monthly meetings, the 2nd Thursday of the month, via Zoom at 7:30pm. The next meeting is **Thursday, March 11th, 2021 at 7:30pm Zoom Meeting ID number is: Meeting ID: 825 9788 8034 and the Passcode is: 580795**

To ensure a pleasant experience with your Zoom Meeting, we highly encourage individuals to download and install the Zoom Application beforehand.

To download and install the Zoom Application:

Go to <https://zoom.us/download> and from the Download Center, click on the Download button under "Zoom Client For Meetings".

This application will automatically download when you start your first Zoom Meeting.

Once the download is complete, proceed with installing the Zoom application onto your computer.

ZOOM MEETING QUICK LINK

Join Zoom Meeting

<https://us02web.zoom.us/j/82597888034?pwd=UHAyTINoZ0NFWDZjcGFTV2IKV0ViUT09>

A MESSAGE FROM THE PRESIDENT

Hello everyone,

I can hardly believe it's March already. Hopefully, the weather will be warming soon because I can hardly wait to get back out rockhounding! Remember we have the club claim up in Fonda, New York that is open to all members. As voted and approved at our last meeting, only hand and battery-operated tools not to exceed 20 volts are allowed in the claim. There are NO generator operated tools of any kind allowed. Hand tools only. If you have any questions,

please reach out to me. The club has a new Facebook group, SEMMC The Southeastern Massachusetts Mineral Club, where we are holding weekly mineral auctions. We also have an auction committee that is looking for volunteers! As the pandemic restrictions change, now is the time to get planning done. If you have minerals you would like to donate, please let me know as we now have a plan to sort and store materials. As always, I am available if you need anything, the best way to reach me is via email at juliesemmc@gmail.com.

Stay safe and healthy,
Julie Rosenthal Morales
SEMMC President

Message from the Editor

WE WILL BE ONLY BE PRODUCING AN EMAIL EDITION OF THE SEMMC NEWSLETTER

As the editor I will be looking for club members input. If you see a geology article, know of an upcoming rock and mineral show, or just have an idea of something that you would like to see in the newsletter please email me at jbradleysemmc@gmail.com

Thank you and happy collecting
Jim Bradley

Field Trip Agenda

Field collecting trips are open to SEMMC members only, as our insurance policy covers members only. Please bring your SEMMC Membership card with you. All participants of field trips are required to contact trip leaders at least 48 hours in advance of trip date. Schedules may change. Please contact the host to confirm date, time and details. Some trips may be eliminated, added, or altered depending on weather and other circumstances.

However, please remember we do have a club claim in Fonda, NY and it is open year-round, weather permitting.

SEMMC club claim at Diamond Acres in Fonda, NY is there for our enjoyment. Please use it and follow the rules of use, which are pretty simple. All debris **must** be removed after digging. There is **no dumping** of material in the claim. Please place all stone and dirt outside of the roped off areas. No sifting soil anywhere except in the designated sifting area. There is to be no undercutting of trees. The large tree with stone under it is OFF LIMITS...NO EXCEPTIONS!!! Please work in a safe manner and enjoy yourself. **As voted and approved at the February 2021 meeting, only hand and battery-operated tools not to exceed 20 volts are allowed in the claim. There are NO generator operated tools of any kind allowed. Hand tools only. If you have any questions, please reach out to the club President, Julie Rosenthal Morales at juliesemmc@gmail.com.**

As the collecting season nears please keep an eye out for up coming field trips. As always, we care about your safety first so with that being said please expect some COVID-19 restrictions to remain in place for the near future anyway.

The American Federation of Mineralogical Societies "Code of Ethics"

- ◆ I will respect both private and public property and will do no collecting on privately owned land without permission from the owner.
- ◆ I will keep informed on all laws, regulations or 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 such as fences, signs, buildings, etc.
- ◆ I will leave all gates as found.
- ◆ I will build fires only in designated or safe places 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.
- ◆ I will not contaminate wells, creeks, or other water supplies.
- ◆ 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 those 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.

SAFETY BULLETIN



Safety Tip = All geological sites present hazards of varying degrees and further hazardous situations can develop during a visit. Falling rock is a particular hazard and it should not be assumed that any rock face in an active, inactive, abandoned or historic quarry, or forming a natural cliff, is safe. Vehicle movements present a major hazard at active quarries.

PREVENT LYME DISEASE!

- WEAR REPELLENT
- CHECK FOR TICKS DAILY
- SHOWER SOON AFTER BEING OUTDOORS
- CALL YOUR DOCTOR IF YOU GET A FEVER OR RASH

For more information:
www.cdc.gov

How to remove a tick

1. If a tick is attached to you, use fine-tipped tweezers to grasp the tick at the surface of your skin.
2. Pull the tick straight up and out. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
3. Clean the bite and your hands with rubbing alcohol, an iodine scrub, or soap and water.



4. You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease.

Note: Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin.

Mineral of the Month

Wulfenite



Wulfenite from Mexico

Category Molybdate mineral

Formula PbMoO_4 (repeating unit)

Crystal system Tetragonal

Crystal class Dipyramidal (4/m)
H-M symbol: (4/m)

Identification

Color Orange-yellow, yellow, honey-yellow, reddish-orange, rarely colorless, grey, brown, olive-green and even black

Crystal habit Thin tabular to pyramidal

Twinning Twins on the [001] common

Cleavage On {011}, distinct; on {001}, {013}, indistinct

Fracture Irregular to sub-conchoidal

Tenacity Brittle

Mohs scale hardness 3

Luster Adamantine, resinous

Streak White

Diaphaneity Transparent to opaque

Specific gravity 6.5-7.0

Optical properties Uniaxial (-), may be anomalously biaxial

Refractive index $n_\omega = 2.405$ $n_\epsilon = 2.283$

Birefringence $\delta = 0.122$

Pleochroism Weak; orange and yellow

Ultravioletfluorescence None

Other characteristics Specimens may be piezoelectric

Wulfenite is a lead molybdate mineral with the formula PbMoO_4 . It can be most often found as thin tabular crystals with a bright orange-red to yellow-orange color, sometimes brown, although the color can be highly variable. In its yellow form it is sometimes called "yellow lead ore".

It crystallizes in the tetragonal system, often occurring as stubby, pyramidal or tabular crystals. It also occurs as earthy, granular masses. It is found in many localities, associated with lead ores as a secondary mineral associated with the oxidized zone of lead deposits. It is also a secondary ore of molybdenum, and is sought by collectors.

Discovery and occurrence

Wulfenite was first described in 1845 for an occurrence in Bad Bleiberg, Carinthia, Austria. It was named for Franz Xavier von Wulfen (1728–1805), an Austrian mineralogist.

It occurs as a secondary mineral in oxidized hydrothermal lead deposits. It occurs with cerussite, anglesite, smithsonite, hemimorphite, vanadinite, pyromorphite, mimetite, descloizite, plattnerite and various iron and manganese oxides.

A noted locality for wulfenite is the Red Cloud Mine in Arizona. Crystals are deep red in color and usually very well-formed. The Los Lamentos locality in Mexico produced very thick tabular orange crystals.

Another locality is Mount Peca in Slovenia. The crystals are yellow, often with well-developed pyramids and bipyramids. In 1997, the crystal was depicted on a stamp by the Post of Slovenia.

Lesser known localities of wulfenite include: Sherman Tunnel, St. Peter's Dome, Tincup-Tomichi-Moncarch mining districts, Pride of America mine and Bandora mine in Colorado. Small crystals also occur in Bulwell and Kirkby in Ashfield, England. These crystals occur in a galena-wulfenite-uraniferous asphaltite horizon in a magnesian limestone. The wulfenite found in this area is similar in properties (paragenetic sequence, low silver and antimony contents of the galenas and absence of pyromorphite) to the wulfenites of the Alps and may be similar in origin.

Crystallography

Wulfenite crystallizes in the tetragonal system and possesses nearly equal axial ratios; as a result, it is considered to be crystallographically similar to scheelite (CaWO_4). Wulfenite is classed by a pyramidal-hemihedral (tetragonal dipyramidal) (C_4h) crystal symmetry. Therefore, the unit cell is formed by placing points at the vertices and centers of the faces of rhomboids with square bases and the crystallographic axes coincide in directions with the edges of the rhomboids. Two of these lattices interpenetrate such that a point on the first is diagonal to the second and one quarter the distance between the two seconds.

An extensive solid solution exists between the two end members wulfenite and stolzite (PbWO_4), such that tungstenian-wulfenite compositions range from 90% wulfenite and 10% stolzite to chillagite (64% wulfenite, 36% stolzite) and so on.^[9] Nevertheless, the Commission for New Minerals and Mineral Names of the International Mineralogical Association has deemed that the solid solutions do not require new names. The correct nomenclature of the 90:10 solid state is wulfenite- $I4_1/a$ and the 64:36 solid state is wulfenite- $I4$. The structure of the wulfenite- $I4_1/a$ system can be described as a close packing of tetrahedral MoO_4^{2-} anions and Pb^{2+} cations. In the lattice, the MoO_4^{2-} anions are slightly distorted, though the bond lengths remain equal and the oxygens are linked through Pb-O bonds. Each lead atom has an 8-coordination with oxygen and two slightly different Pb-O bond distances. This structure closely resembles that of pure wulfenite.

The structure of wulfenite-*I*4 is also very similar to that of wulfenite-*I*4₁/*a* but has an unequal distribution of tungsten and molybdenum which may explain the observed hemihedrism. It is argued that no miscibility gap exists in the wulfenite-stolzite solid solution at room temperature due to the almost identical size and shape of the MoO₄²⁻ and WO₄²⁻ ions, however, arguments have been made for the existence of a miscibility gap at higher temperatures.

Hemihedrism

The crystals of wulfenite are usually more tabular and thinner than those of scheelite, however, the more pyramidal and prismatic crystals show distinct hemimorphism.

Thermodynamics and reactivity

The heat capacity, entropy and enthalpy of wulfenite were determined taking into consideration the existence of solid solutions and the inclusion of impurities. The reported values are as follows: Cp°(298.15) = 119.41±0.13 J/molK, S°(298.15) = (168.33±2.06)J/molK, ΔH° = (23095±50) J/mol.

When forced through a tube into a flame, wulfenite disintegrates audibly and fuses readily. With the salt of phosphorus, it yields molybdenum beads. With soda on charcoal it yields a lead globule. When the powdered mineral is evaporated with HCl, molybdic oxide is formed. Molybdenum can be extracted from wulfenite by crushing the ore to 60-80 mesh, mixing the ore with NaNO₃ or NaOH, heating the mixture to about 700 °C (decomposing), leaching with water, filtering, collecting the insoluble residues which may include Fe, Al, Zn, Cu, Mn, Pb, Au and Ag, then the NaMoO₄ solution is agitated with a solution of MgCl₂, filtered, CaCl₂ or FeCl₂ or any other chlorides is added to the Mo solution and heated and agitated, filtered and the desired product is collected. The full process is patented by the Union Carbide and Carbon Corp.



Wulfenite from the Red Cloud Mine, Arizona



Mina Ojuela, Mapimi, Durango, Mexico

From Wikipedia, the free encyclopedia

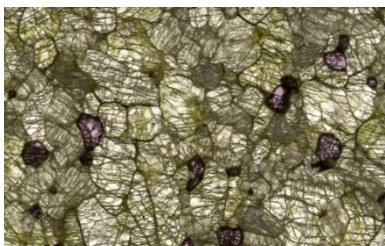
SEMMC Stickers and Patches Are Now Available

SEMMC stickers and patches are now available. Stickers are \$5 each while the patches will be sold for \$3. Our digging season is now upon us. See Julie Morales at the meeting or contact her by email juliesemmc@gmail.com Enjoy the season!

Geology Article

New Theory About the State of Earth Billions of Years Ago: Clearer Insight Into Earth's Hidden Crystals

By TRINITY COLLEGE DUBLIN FEBRUARY 17, 2021



A transmitted light view through a 200-micron section of a peridotite sample, showing the three main minerals — olivine (clear-green), orthopyroxene (grey-green) and garnet (pink). Credit: Dr. Emma Tomlinson, Trinity College Dublin.

Geologists have developed a new theory about the state of Earth billions of years ago after examining the very old rocks formed in the Earth's mantle below the continents. Assistant Professor Emma Tomlinson from Trinity College Dublin and Queensland University of Technology's Professor Balz Kamber have just published their research in leading international journal, *Nature Communications*. The seven continents on Earth today are each built around a stable interior called a craton, and geologists believe that craton stabilization some 2.5 – 3 billion years ago was critical to the emergence of land masses on Earth. Little is known about how cratons and their supporting mantle keels formed, but important clues can be found in peridotite xenoliths, which are samples of mantle that are brought to the Earth's surface by erupting volcanoes.

Dr. Tomlinson, from Trinity's School of Natural Sciences, said: "Many rocks from the mantle below old continents contain a surprising amount of silica — much more than is found in younger parts of the mantle." "There is currently no scientific consensus about the reason for this." The new research, which looks at the global data for mantle peridotite, comes up with a new explanation for this observation. The research used a new thermodynamic model to calculate that the unusual mineralogy developed when very hot molten rock— greater than 1700 °C — interacted with older parts of the mantle and this caused the growth of silica-rich minerals. "For more than 1 billion years, from 3.8 to 2.5 billion years ago, volcanoes also erupted very unusual lavas of very low viscosity — lava that was very thin, very hot and often contained variable levels of silica," Dr. Tomlinson added. "Our modeling suggests that the unusual lavas were in fact the molten rocks that interacted with the mantle at great depth and this interaction resulted in the variable level of silica."

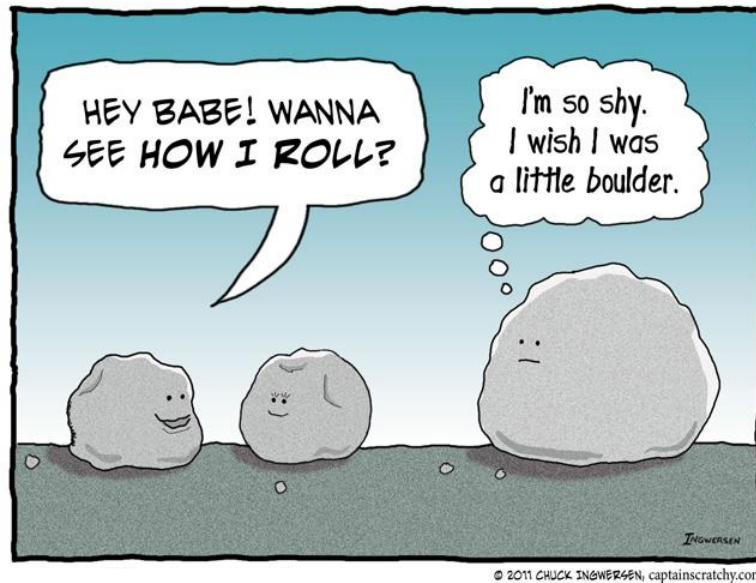
Professor Kamber, QUT, said: "Both the silica-rich rocks in the deep mantle and the low viscosity volcanic rocks stopped being made by the Earth some 2.5 billion years ago. This timing is the boundary between the Archaean and Proterozoic eons — one of the most significant breaks in Earth's geological timescale." What caused this boundary remains unknown, but the research offers a new perspective. Professor Kamber added: "This may have been due to a

change in how the mantle was flowing. Once the mantle started slowly turning over all the way down to the core (2,900 km), the very high temperatures of the Archaean eon were no longer possible.”

Reference: “Depth-dependent peridotite-melt interaction and the origin of variable silica in the cratonic mantle” by Emma L. Tomlinson and Balz S. Kamber, 17 February 2021, *Nature Communications*.

DOI: [10.1038/s41467-021-21343-9](https://doi.org/10.1038/s41467-021-21343-9)

The Funnies



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We Need Volunteers

Every club is only as successful as those people who give of their time to make it so. Our club is no different. Currently, we need people to step up and volunteer to fill some very important positions. The President has appointed chairpersons for the following committees: Field trip committee, Nominating committee (to be appointed during April), Program committee, Refreshment committee, Publicity committee, Historical committee, Quartermaster committee, and any other committee deemed necessary. If anyone is interested in volunteering for any of the committees, please contact the committee chairperson.

Membership Renewal

Your dues help keep us going. Dues pay for the newsletter, correspondence, refreshments, speakers, and a host of other expenses. Dues are as follows:

-Individual Membership \$15.00 Yearly Dues with e-mail newsletter-

-Family Membership * \$20.00 Yearly Dues with e-mail newsletter-

*** Family Membership must list all family members as of September 1 of the membership year.**

Tear off and return with your payment made out to SEMMC, Inc.

Date _____ Name(s) _____

Name(s) and Age(s) of children _____

Address _____

City _____ State _____ Zip code _____

Phone(s) _____ Email address _____

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