Azurite

By Susan Celestian

Azurite is an iconic Arizona mineral - a product of the copper mining that built the state.

Chemical Formula - Cu₃(CO₃)₂(OH)₂


- Hardness - 3.5-4
- Color - Azure blue (pale to dark blue)
- Luster - Vitreous
- Streak - Pale blue
- Specific Gravity - 3.77
- Cleavage - 2 distinct directions (1 perfect, 1 fair)
- Other - as a carbonate, it will fizz in acid

Azurite occurs as a secondary mineral in the enriched oxidized zones of copper ore deposits. As a review of the zonation due to supergene enrichment (due to weathering of the primary ore deposit), refer to Figure 1.

The type locality -- place where a mineral is first described -- for azurite is Chessy-les-Mines, near Lyon, France. And for a while azurite was known as Chessylite (a term still used by some). The name was changed by Francois Sulphice Beudant, in 1824. The name derives from Persian lazward, for ‘blue’.

It is one mineral for which color is diagnostic -- it is blue. It occurs as discreet crystals, mineral aggregates (balls, “dollars”, stalactites, and other nodules), and veinlets and crusts along fractures within a rock mass. At https://www.minerals.net/mineral/azurite.aspx you can see images of four monoclinic crystal forms -- use the cursor to rotate the images.

A green copper carbonate, malachite, is often found to be replacing azurite, resulting in attractive blue and green specimens. Frequently replacement is complete, producing pseudomorphs (pseudo - false; morphs - forms) of malachite after azurite -- the crystal form of azurite is occupied by the mineral, malachite. Figures 6-19 depict azurite in some of its various habits (shapes & forms).

**PROCESSING:** Rocks from the oxidized zone are piled up into leach pads, underlain by impermeable material. Dilute sulfuric acid is sprayed onto the pads (see Figure 2), copper is leached out, and copper-rich solution (pregnant leach solution - 60-70% copper) is collected at the bottom of the pile (see Figure 3). This solution is chemically enriched about 30x (electrolyte solution), and then copper is recovered out of it by electrolysis, onto pre-formed copper starter sheets or stainless steel blanks (see Figure 4). This process is called SX-EW (solvent extraction-electrowinning). In 5-10 days, 250-375 pounds of copper will have plated onto each sheet.

Azurite continued on page 4....
April 2, 2019
Board of Trustees Meeting Minutes

• In attendance: Bill F., Bob E., Claudia M., Cynthia B., Deanne G., Don R., Ed W., Howard R., Rebecca S., Stan C., Sue C. and Tammy E.
• Minutes from March approved
• Financial report for show and club were discussed by Cynthia B.
  o Club made great money at the show
    • Income: $16,704.80, up 7.3% from last year
  o Audit and budget were discussed
  o Large items being approved can overlay many small purchases
  o For private buys, at least an email or picture must be given for proof of purchase
  o Mileage and gas should only be approved for scouting trips
  o Cynthia will report on missing receipts
    * Civic building needs proper paperwork
      o Will have a meeting with the buildings accountant to resolve charges and paperwork
    * Other documentation needs to be improved otherwise card holding privileges or compensation will be taken away
  o Thank you, Dave H., for creating a very comprehensive audit
  o Howard R., was proposed by Ed W. to create an audit for 2018-2020
• Claudia M. discussed the scholarship applicants
  o Only 2 were received by deadline
  o Award will be given May 25th
  o Winner will be picked at next month’s meeting
• Saturday night fluorescent trip needs supplies
  o Approved by board to purchase items for trip
    • Propane grill, ribbons, glow sticks, 2 tables, 2 coolers, food and drinks
    • Cost of about $200-$300
  o Claudia M. also discussed the club application form
    o Added end of year barbeque on volunteer area
    o Membership price change updated
    o Name tag badge will be put on different page
    o All changes approved
• Ed W. setup show summary meeting Tuesday the 9th of April

Respectfully submitted,
Rebecca Slosarik

April, 2019
General Club Meeting Minutes

• Ed W. opens with club having best show in club history
  o Vendors made great money
  o Jeanne and Bill S. say thanks to everyone that helped in successful kid’s corner
    • Made $480
  o Thanks to Nancy for all the announcements
  o Dave H. for fluorescents display
  o Tiffany P. for membership table
  o Jennifer for wire wrapping
  o Linda R. for admissions
  o Robin S. for raffle, donated by vendors
  o Howard R. for marketing
• Minutes for March approved by members
• Cynthia B. discussed financials
  o Club made great money at show
• Jim R. discussed Saturday fluorescent field trip
  o Got access from owners of Scott mine
  o Old copper and zinc mine, can also find fluorite, calcite and willemite
  o Email with details sent out
• Howard R. presented video on jasper
  o Video of Steve Schuttz finding plume agates and picture jasper in southeastern Oregon
• Raffle made $124
  o Led by Robin S.
• Buying, selling and swapping filled the rest of the meeting

Respectfully submitted,
Rebecca Slosarik

Photo by Susan Celestian
April 9, 2019
Show Meeting Minutes

• Open meeting, no attendance necessary
• Jim R. discussed vendors
  o 37 vendors
  o Down in tables because of layout
  o All did well with timing and products brought
  o One claimed loss of specimen
  o Mix of vendors was good
    • Missing lapidary supplies because that vendor was in Albuquerque show
  o Albuquerque show might continue to be a conflict
  o Using lobby for vendors was discussed
    • Traffic would be an issue, so lobby will not be used
  o Vendor fee increase discussed
    • 10% increase per year, denied
• Cynthia B. discussed financials
  o Bob E. bought rocks for club
    • Between this purchase and the boneyard sale from museum, this purchase will not be necessary again for a couple of years
• Marketing was discussed
  o New Barro’s owner would not allow coupons this year
  o S.T.E.A.M. night was a success
  o Going to the Anthem park on game nights was a success
  o Clark L. was approved as the new second marketer for show
• Dr. rock in kids’ corner should be advertised now
  o Scout masters could be used as a resource to advertise
• Admissions table was discussed
  o Change needs more 1’s, 5’s and 10’s
  o Coupons went well
• Membership table was discussed
  o Ran out of membership paperwork
  o Tiffany P. has just been using her older mac laptop to display club photos
  o Wire wrapping and faceting displays helped
    • Wire wrapping also had its best attendance ever after the show
  o Next year there will be improvements to displays
    • Will have more items and better cabinets next time
    • Will also use a member to answer questions, will be assigned

Don R. will have more time this year to make improvements
  • Will extend towards bathrooms
  • ATM worked properly, made money from sales
• School security is lacking
  o Tried to get footage to find missing vendor item, have not heard back from school
  • Even principal is ignoring requests for footage
• Food vendors discussed
  o Should setup tables outside so people can eat on them
  o High school students discussed as sellers
  o Hot dog seller discussed as potential
  o Food vendor was absent this year because car broke down
    • They wanted to be there, just couldn’t make it
• Other improvements needed
  o Will need more signs around town
  o Will continue with highway signs
  o Concentrate advertising to more in town only
  o Have club go to more local S.T.E.M./S.T.E.A.M. nights
  o 3-day show discussed as not being viable
  o Parking limitations cannot be fixed
  • As the club continues to grow, management will continue to improve

Respectfully submitted,
Rebecca Slosarik
FIELD TRIP
BLACK PEARL & SCOTT MINES
APRIL 6, 2019
(Photos by Stan Celestian, Nancy Gallagher & Susan Celestian)

A field trip with a different format, the evening outing for fluorescent rocks was very well attended. At the Black Pearl Mine, a delicious potluck, with burgers and dogs by Chef Winbourne, got the trip off to a great start! Then after dark two groups ventured out to spots at the Scott Mine & the Black Pearl Mine. On the way out, Stan & Sue saw tons of kangaroo rats and a night owl -- WILD LIFE (LIFE IS WILD)!

That’s a spicy Clarkcorn!

Keep getting those kids out for rocks!!

Mojave Aster
(Xylorhiza tortifolia)

That's a spicy Clarkcorn!

Fremont’s Pincushion
(Chaenactis fremontii)

Field Trip continued on page 5….
Sand Blazingstar  
(*Mentzelia involucrata*)

Mohave Desertstar  
(*Monoptilon bellioides*)

Roughing it in style
The final product is called a copper cathode, and it is 99.99% to 99.9999% copper, depending on the plant (see Figure 5).

**USES:** The primary use of azurite is as collectable mineral specimens. They are an attractive blue; often associated with bright green malachite; frequently very lustrous; and, as mentioned earlier, exhibit interesting habits (see Figures 6-19). Of course, azurite is an ore mineral of copper -- although it is not as abundant as other copper minerals, such as chrysocolla. Historically, and currently to a limited extent, azurite has been used as a pigment for paint and cosmetics. It was important in the paintings of the Fourth Dynasty of Egypt (2613-2494 BC), and dominated as blue pigment in European paintings during the 1400’s through the 1600’s. Prepared properly, it is stable and retains its color for long periods. And finally, azurite is used in jewelry, as cabochons and beads.

**REFERENCES:**
Azurite continued from page 6

**FIGURE 7** Nodular azurite, Lost Lake Claim, Nacimiento Mine, Cuba, NM *Photo by Stan Celestian*

**FIGURE 8** Azurite balls being replaced by malachite, Blue Ball Mine, Globe, Gila Co., AZ *Photo by Stan Celestian*

**FIGURE 9** Azurite balls, washed out of clay, in which it formed. Blue Ball Mine, Globe, Gila Co., AZ *Photo by Stan Celestian*

**FIGURE 10** Acicular azurite, Tousitt, Oujda, Morocco *Photo by Stan Celestian*

**FIGURE 11** Azurite, 4600’ level, Morenci Mine, Graham Co., AZ *Photo by Stan Celestian*

**FIGURE 12** Small rosettes of lustrous azurite are scattered across the matrix. Morenci Mine, Graham Co., AZ *Photo by Stan Celestian*

Azurite continued on page 8...
...Azurite continued from page 7

**FIGURE 13**
Azurite Balls
The image on the upper left is of an aggregate of crystals from Morenci Mine, Morenci, Graham Co., AZ. The image on the lower left is of a specimen from Guangdong Province, China.
*Photos by Stan Celestian*

**FIGURE 14**
Electric blue azurite, Bisbee, Cochise Co., AZ
*Photo by Stan Celestian*

**FIGURE 15**
Azurite rosettes on malachite, from the 4600’ level, Bisbee Mine, Cochise Co., AZ
*Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA Cat #NHMLA 3171*

**FIGURE 16**
Highly lustrous azurite from Milpillas Mine, Cananea, Sonora, Mexico.
*Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA Cat #NHMLA 63547*

**FIGURE 17**
Azurite from the type locality, Chessy-les-Mines, Rhone, Rhone-Alpes, France.
*Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA Cat #NHMLA 31934*

Azurite continued on page 9....
...Azurite continued from page 8

**FIGURE 18** Blocky azurite from Broken Hill, NSW, Australia. Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA. Cat #NHMLA 7359

**FIGURE 19** Lustrous single crystal of azurite from Tsumeb, Namibia. Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA. Cat #NHMLA 65674

**FIGURE 20** Azurite from Bisbee, Cochise Co., AZ. Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA. Cat #NHMLA 6664

**FIGURE 21** Three specimens of azurite from the Czar Mine, Bisbee, Cochise Co., AZ. Photo by Stan Celestian and courtesy of the Natural History Museum of Los Angeles Co., CA. Cat #NHMLA 3207, 33737, & 43464.
**UPCOMING FIELD TRIPS**

**WHEN:** Saturday, May 25, 2019  
**WHERE:** Flagstaff area  
**WHAT:** Obsidian, Lava Tube  
**MEET:** Leaving Anthem Civic Building at 7:30 am, OR meet at the Parks Exit off I-40 at 10:00 am.  
**LEADER:** Ed Winbourne  
**OTHER:** Picnic at lava tube not far from collecting area.

**WHEN:** Saturday, June 1, 2019  
**WHERE:** Lynx Creek near Prescott  
**WHAT:** Gold  
**MEET:** TBA  
**LEADER:** Stan Celestian

**WHEN:** June (TBA)  
**WHERE:** New River  
**WHAT:** Banded Iron & Yellow Jasper  
**MEET:** TBA  
**LEADER:** Ed Winbourne

**DATES SUBJECT TO CHANGE**

Stan and the field trip committee will be actively looking for productive spots for field trips. If you have any suggestions, you are encouraged to contact him at stancelestian@gmail.com

**NEEDED: QUALITY MINERAL (or OTHER) DONATIONS WITH LABELS** -- for monthly raffle prizes; and for raffle, door prizes, and sales tables at the annual show. If you have specimens to donate, please see Robin Shannon. The Daisy Mountain Rock and Mineral Club is a 501(c)(3) non-profit organization, and will gratefully acknowledge your donation with a Tax Deduction Letter. Thank You!

**NOTE FROM THE EDITORS**

Have a geological interest? Been somewhere interesting? Have pictures from a club trip? Collected some great material? Send us pictures -- or write a short story (pictures would be great).  
Deadline for the newsletter is the 22nd of the month.  

Mail or Email submissions to:  
Susan Celestian  
6415 N 183rd Av  
Waddell, AZ  85355  
azrocklady@gmail.com

**WIRE-WRAPPING CLASS**

4:30-6:30 pm  
Prior to the meeting on Tuesday, May 7, 2019

- Bring: cab or stone, about quarter-sized or larger; 26 and 18 gauge copper-based dead soft wire; round nose pliers and wire cutter, beads (optional), little clamps, masking tape, E6000 jewelry glue.

Free, but donations are appreciated.  
Questions? Contact Jennifer at Jennifer@eliteshuttersandblinds.com

Now that’s a Topaz crystal! The crystal (from Brazil) is in the Natural History Museum of LA County’s collection (NHMLA 8028), and is used here with their permission.  
The photo on the right is a close-up of growth hillocks found on the crystal’s termination. (Growth hillocks form when dislocations occur on the growing surface. Their shape and orientation reflect the atomic structure of the given mineral.) Photo by Stan Celestian

Visit http://rmfms.org/ for news about conventions, events, and associated clubs.  
If you are travelling, you might want to contact a club local to your destination. Maybe they have a field trip you could join, while in town.
**UPCOMING AZ MINERAL SHOWS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Show Name</th>
<th>Location</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 4-5</td>
<td>Kingman, AZ</td>
<td>Mohave County Gemstoners; Kingman Academy of Learning, 3420 N Burbank; Sat 9-5, Sun 9-4; Admission: free.</td>
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<td>July 6-7</td>
<td>Pinetop, AZ</td>
<td>White Mountain Gem &amp; Mineral Club; Hon-Dah Casino and Resort, 777 Hwy 260; Sat 9-6, Sun 10-4; Admission: $2 adults, free for children under 16.</td>
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<td>August 2-4</td>
<td>Prescott Valley, AZ</td>
<td>Prescott Gem and Mineral Club; Findlay Toyota Center, 3201 N Main St.; Fri-Sat 9-5, Sun 9-4; $5 adults, $4 seniors, vets, students, free for children under 12 (cash only).</td>
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<tr>
<td>September 20-22</td>
<td>Payson, AZ</td>
<td>Payson Rimstones Rock Club; Event Center Mazatzal Hotel &amp; Casino, Hwy 87, Milepost 251; Fri 4-8, Sat 9-5, Sun 10-4; Admission: $3, children under 12 free.</td>
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<tr>
<td>October 12-13</td>
<td>Sierra Vista, AZ</td>
<td>Huachuca Gem &amp; Mineral Club; Cochise College, 901 N Columbo Av; Sat 9-5, Sun 10-4; Admission: free.</td>
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A good source for a list of Arizona Mineral Clubs and contact information is [http://whitemountain-azrockclub.org/Public_AZ_Clubs_Links.html](http://whitemountain-azrockclub.org/Public_AZ_Clubs_Links.html)