



Conglomerate

March, 2011 - Volume 7, Number 3 <www.baltimoremineralsociety.org>

Baltimore Mineral Society

The Baltimore Mineral Society is a member of the Eastern Federation of Mineralogical Societies and affiliated with the American Federation of Mineralogical Societies.

The BMS was established in order to allow its members the opportunity to promote the study of mineralogy and to act as a source of information and inspiration for the mineral collector.

Meetings are held the 4th Wednesday of each month (except October, December and June) at the Cockeysville Volunteer Fire Hall beginning at 7:15 pm..

Directions: From I-83 take the Shawan road exit 20A east toward Cockeysville, and after 0.8 miles turn right on York Road. Look for the Finch/John Deere dealer on your right and turn right into the driveway between John Deere and the Hunt Valley Animal Hospital. There is a sign for the fire company at the turn. Drive down the hill to the parking lot and park to your left at the side of the lot directly away from the entrance doors. Do not block the big doors housing emergency vehicles and do not park in the middle of the parking lot where firefighters park when they arrive to answer an alarm. Enter through the green doors and take the stairs up to the Social Room.

BMS March Meeting

from Jake Slagle, Program Chair

The March BMS meeting will occur on Wednesday March 23rd beginning at 7:30 pm at the Cockeysville Volunteer Fire Company social room.

The long awaited program will be New Developments in North American Diamond Discovery and Production given by Bob Hudgins. Bob says his talk will include the chemistries of diamond formation and emplacement, prospecting methods and likely areas for new discoveries. The meeting will be hosted by Jake Slagle.

Rubble from the President

by Brad Grant, President

As I am writing this, I am really hoping we get some warm and dry weather here. The rains just cancelled our trip to Churchville and all that hard work I did last fall on my back yard.... well, can you now say mud hole!!!!

It was nice seeing the large turnout at February's meeting. This is your club and the more people who attend meetings and participate the better the club will become.

Patty and I went to the Delaware Mineral show and we had a good time. It was great seeing a lot of people from BMS at the show. I bought a piece of green and purple Fluorite, marked \$40 for \$10.00. Somehow I think the dealer got the better end of this sale!!!

I am working on lining up some trips over the next two months. I have a tentative date of May 7th for Allegany Aggregates in Flintstone, Maryland. From an e-mail from Fred Parker: the Quarry is a limestone quarry and the following specimens can be found; Fluorite, Calcite, Strontianite, Sulfur and Pyrite. Hopefully, we will be able to get into the quarry and find some of these items.

The Atlantic Micromounters Conference is scheduled for April 1st through the 3rd in Elkridge Maryland. What I enjoy most about a micromount conference is the incredible beauty of the crystals that are found on these tiny specimens. If you are not familiar with micromounting then I would encourage you to go to this show. Tom Loomis, from South Dakota, will be presenting three talks over the weekend, and there will be dealers and give-away specimens and lunch (included with your fee) as well.

I hope to see everyone at the March meeting and if anyone has any ideas as to how to drain a backyard swamp, shoot me an e-mail.





President: Bradley Grant
<info@baltimoremineralsociety.org>

Vice President: Jim Hooper

Secretary Carolyn Weinberger

Treasurer: Bob Hudgins

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Dues are \$10 for individual members and \$15 for family memberships. Send payment along with your name, list of family members if applicable, address, phone and e-mail to: Bob Hudgins, 6713 Balmoral Overlook, New Market, MD 21774.

Write for "The Conglomerate"! Send news, announcements, comments, observations, or articles to <mseeds@fandm.edu>. No e-mail? Hand in your submission at a meeting.

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Minutes of the February Meeting

by Carolyn Weinberger, Secretary

President Bradley Grant called the February 23rd meeting of the Baltimore Mineral Society to order at 7:30 P.M.

The minutes of the December meeting were accepted as printed in the January Conglomerate. (The January meeting was cancelled due to snow.) Treasurer Bob Hudgins, although not present, indicated in his report that the club remains solvent. Members were reminded that dues were being accepted.

Brad sent around a sign-up sheet for meeting refreshment volunteers. The March meeting will be hosted by Jake Slagle.

Unfinished Business:

Revision of the BMS Bylaws. Jim Hooper moved, seconded by Ed Goldberg, that the revised Bylaws be accepted as printed in the January Conglomerate. The motion carried and the new Bylaws become affective immediately.

New Business:

Brad indicated that he was contacted by a local Girl Scout troop that wanted a presentation about rocks and minerals. Brad is working on a date and time and although he will handle the presentation, asked for ideas from the members. He also indicated that he would like to take the troop to either Texas Quarry or Mineral Hill for some minor collecting, probably in April.

Announcements:

A sign-up sheet for meeting refreshment volunteers was circulated.

Bradley indicated that he is setting up a March 12th field trip to the Churchville Quarry and that a tentative trip to Havre de Grace has been set for April 23rd. He's also contacted Allegheny Aggregates to set up a future collecting trip.

Brad encouraged members to submit articles to Editor Mike Seeds for the Conglomerate and to volunteer to present a future program for our meetings.

The business meeting was adjourned at 7:50 pm. after which a program on the Geology of Maryland was presented by Martin Schmidt.

Biogenic Minerals: Biological Processes in Geology

by Ed Goldberg

Those who collect fossils (not me) understand instinctively that once-living things can be preserved in rock, so it will not come as any surprise to them how important biological processes are to geology and mineralogy. This is a concept that mineral collectors do not usually think about. However, every calcite crystal, in fact, virtually every carbonate rock, seems to be the relic of sedimentary accumulation of the shells of sea life, often metamorphosed into disappearance. Who would think that Medford Quarry was made by clams? But in caricature, that's how it got there! (The quarry industry is about getting the clams OUT of the quarry).

• Upcoming Shows:

For the latest information, check out the web site of the Eastern Federation of Mineral and Lapidary Societies: <http://www.amfed.org/efmls>.

April:

1-3: Atlantic Micromounters Conference, MHA Conference Center, Elkridge. Featured speaker: Tom Loomis.

2-3: Annual Mineral Treasures & Fossil Fair sponsored by the Philadelphia Mineral Society & Delaware Paleontological Society. LuLu Temple, Plymouth Meeting, PA.

11-17: EFMLS Wildacres Workshop. Gene LaBerge, Speaker-in-Residence.

14-17: Rochester Mineralogical Symposium

May:

14-15: 43rd Annual World of Gems & Minerals sponsored by the Berks Mineralogical Society. Leesport Farmers Market Banquet Hall, Rt 61; Leesport, PA.

21: 22nd Annual Chesapeake Gem & Mineral Show. Ruhl Armory, Towson, MD. Hours 10 am – 4 pm.

June:

4 - Spring Mineralfest sponsored by the Pennsylvania Earth Science Association. Macungie Memorial Park, Macungie, PA.

August:

12-14: East Coast Gem, Mineral & Fossil Show. West Springfield, MA. "Little" Tucson on the east coast!

Biogenic Minerals

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The relationship of biology to mineralogy is profound. According to one emergent view (Robert Hazen of the Carnegie Institute, reviewed by Bruce Sterling, <www.newscientist.com> "Life caused explosion in our planet's mineral wealth"), life, which first appeared about 4 billion years ago (a mere half-billion years after the formation of the earth) wrought dramatic changes to the chemistry of the atmosphere and the oceans. For the first time, significant free oxygen was created by photosynthesis carried out by cyanobacteria. The subsequent effects of oxidation and weathering about tripled the then- number of minerals on earth. (About half of the 4500+ mineral species known today are said to exist because of weathering or oxidation).

In a 2008 issue of American Mineralogist ("Mineral Evolution"), Hazen and his colleagues state: "The stages of mineral evolution arise from three primary mechanisms: (1) the progressive separation and concentration of the elements from their original relatively uniform distribution in the pre-solar nebula; (2) an increase in range of intensive variables such as pressure, temperature, and the activities of H₂O, CO₂, and O₂; and (3) the generation of far-from equilibrium conditions by living systems. The sequential evolution of Earth's mineralogy from chondritic simplicity to Phanerozoic complexity introduces the dimension of geologic time to mineralogy and thus provides a dynamic alternate approach to framing, and to teaching, the mineral sciences."

Biological activity is directly or indirectly responsible for a number of specific mineral species in many of their occurrences: calcite, vivianite and other phosphates, and nitrates. But even more pervasively, microorganisms are known to interact with minerals and change them. Their biological action chemically alters minerals to create new ones. This latter fact informs a primary strategy for searching for extraterrestrial life, as with the recent focus on Mars. (Banfield, et al, "Mineralogical Biosignatures and the Search for Life on Mars", Astrobiology, Vol I, No.4, 2001). For example, the iron sulfide *mackinawite* is often formed by bacteria reducing the iron in sulfate deposits.

Other minerals have unusual concentrations of trace elements due to precipitation by microorganisms. Siderite can contain trace amounts of Mg and/or Ca, which vary depending on the rate of activity of microorganisms involved in the formation of the mineral deposit. Certain formations of magnetite occur only as a result of microbial activity. The extensive banded iron ores of the upper midwest are believed to have been largely due to precipitation by biological processes.

Here is another "sampler" of biogenic minerals (Science Frontiers Online, Nov-Dec.1989): Much of the world's travertine and "siliceous sinter" (common opal) are deposited through the action of algae. Much of the pyrite and marcasite in sedimentary rocks occurs from the bacterial reduction of sulfate ions. The breakdown of petroleum by bacteria makes complex organic chemicals that dissolve, transport, and precipitate quartz. Even Herkimer diamonds may be made in this way. Mitochondria in cells make crystals of hydroxylapatite. The apatite that composes bones and teeth are obviously biological. "Biomineralization" is thought to occur at the cell wall or just inside cells. (Danielle Fortin, Science Magazine, 12 March 2004). It is a phenomenon known in all six "taxonomic kingdoms". Most commonly, biominerals involved with organic polymers such as collagen and chitin add structural support to skeletal components.

The pervasive relationship between minerals and life is another intriguing aspect of the subject of our hobby.

• Other Local Clubs

♦ **American Fossil Federation.** Meetings are held the 2nd Sunday of alternate months (Jan., March etc.) at 10:30 am at the Bowie Community Center, Bowie, MD.
<americanfossilfederation.com>

♦ **Chesapeake Gem & Mineral Society.** Meetings are held the 2nd Friday of each month (except August) beginning at 7:30 pm at the Woman's Club of Catonsville, 10 St. Timothy's Lane. Catonsville, MD.

♦ **Gem Cutters Guild of Baltimore.** Meetings are held the 1st Tuesday of each month except January, July and August beginning at 7:30 pm at Meadow Mill at Woodberry, 3600 Clipper Mill Rd, Suite 116; Baltimore, MD 21211.
<gemcuttersguild.com>

♦ **Maryland Geological Society.** Meetings are held the 3rd Sunday of alternate months (January, March etc.) beginning at 11 am at the South Bowie Community Center.
<www.ecphora.net/mgs>

♦ **Patuxent Lapidary Guild.** Meetings are held the 3rd Monday of each month at 7 pm. at 169 Defense Highway, Annapolis, MD.
<www.patuxentlapidary.org>

Collection Types

By Thomas Pallanta, Jr., from *Rock Chatter*, February, 2011

One of the great advantages of rock and mineral collecting is the range and variety of collecting that you can do. There are various ranges of generalized or specialized collecting. This gives the collector a considerable selection of activities. Here are some examples to guide you.

The General Collection – Just about everyone starts out this way. You quite simply collect whatever catches your fancy. Such collections are full of variety and many collectors stay on this particular route.

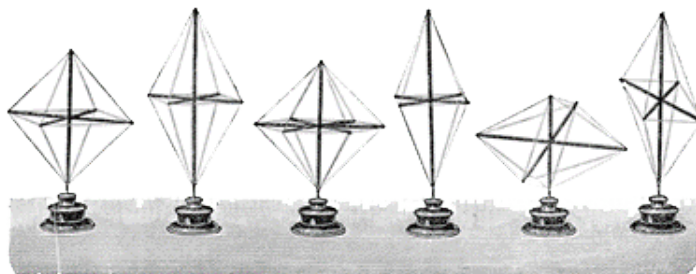
The Rock Type Collection – A collection like this is usually for the geologist or the serious amateur geologist. One collects rocks of the various types for study. The collection can be general for someone who is interested in learning the various geological processes. Then again, one can specialize.....like 'Volcanic Materials'.

The Single Mineral Species Collection – In this case one collects specimens of one mineral species in all of its known forms from as many locations from around the world. For example, I have a fifty specimen collection of smithsonites.

The Single Mineral Class Collection – Also called 'Single Mineral Family' collections. Here you collect all minerals of a specific mineral class such as sulfides, carbonates, oxides, phosphates, etc.

The Single Chemical Elements Collection – These are usually collections based on a single chemical element like copper, lead, zinc, iron, uranium, etc. In this case you collect all mineral species which have that particular element as their main component.

The Pseudomorph Collection – Pseudomorphs are minerals that have the crystal form of another species through alteration or chemical replacement. One example is pyrite replaced by limonite.



The Crystal Collection – In this case, one simply collects crystals. One can specialize in collecting the various forms of a single family like calcite or quartz. On the other hand, one can simply collect crystals from the various crystal systems (cubic, hexagonal, rhombohedral, tetragonal, orthorhombic, monoclinic, and triclinic). Then again, you could just collect whatever types of crystals that catch your fancy.

The Dana Collection – Here one strives to collect one of every mineral species listed in the table of "Dana's Manual of Mineralogy". This is usually a collection for the serious amateur mineralogist.



Collection Types

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The Ore Minerals Collection – This is where one collects the various types of ores or ore-bearing minerals. One can specialize in collecting a single family of ores such as copper ores. On the other hand, you could generalize. This is a good area of collecting if you have an interest in mining.

The Ultraviolet Minerals Collection – Also called ‘fluorescent mineral collection’. Here a person specializes in collecting minerals that fluoresce under the ultraviolet light. You can collect all of the various kinds of fluorescent minerals or you could specialize. Some collectors try to get specimens of minerals from a single location like Franklin, NJ. Then there are people who specialize in minerals that only fluoresce under long-wave or short-wave ultraviolet light.

The Gemstone Collection – As the name indicates, you collect gem materials. You can collect a single family, like feldspar gems. One could also collect various types of rough gem minerals and crystals. Only the very rich tend to collect precious gems. That is the acme of mineral collecting.

These are just a few of the different types of collections one could enjoy. Remember, whichever collection type you choose, document your specimens.



You know of course, that our marriage is on the rocks!
via Golden Spike News, March, 2000

Shoobox Adventures: Mere Aragonite

by Mike Seeds

Steve Voynick writes a column called “Rock Science” in the magazine, Rock and Gem. Last fall he wrote about calcite and aragonite, and that sent me looking at my collection. I have 15 specimens of aragonite, and I never thought much about them. After all, they are just aragonite. Voynick’s article also sent me looking into the story of aragonite, and it turns out to be more complicated than you might expect. And more interesting.

In his column, Voynick explains that aragonite and calcite are polymorphs of the same chemical compound, CaCO_3 . They have the same chemical makeup but they crystallize differently. Aragonite is orthorhombic while calcite is hexagonal. How do the little atoms know which crystal system to follow? Voynick explains that calcite is the high pressure form and aragonite is the low pressure form. Under high pressure, the atoms are compressed to smaller size and fit differently into the crystal structure – you get calcite. At lower pressure the atoms are larger and the atoms take up a different arrangement – you get aragonite.

Astronomers are used to atoms floating in space or in the low pressure atmospheres of stars, so squeezing an atom seems a bit odd. But a quick check with BMS member and chemist, Al Pribula, reveals that the electron cloud that defines the outer boundary of an atom is indeed sensitive to pressure. Under high pressure, the atoms really do get smaller, and it isn’t hard to find higher pressures if you just descend a few hundred meters down into the Earth. Aragonite, familiar from cave decorations, forms up here with us low pressure folk. That makes sense.



Aragonite Laurion Greece. Field of View 1 cm

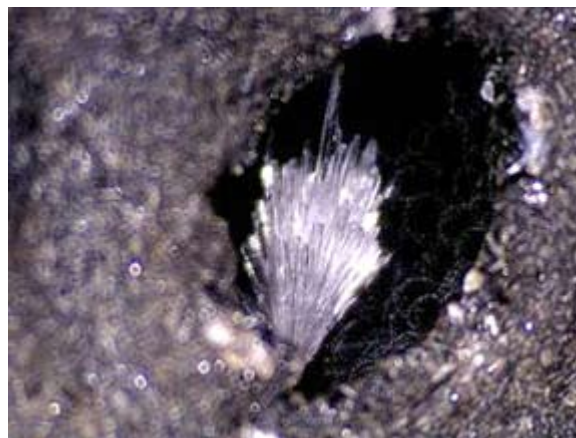
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My aragonite specimens look so delicate; they really do suggest low pressures. One from Laurion, Greece consists of tiny puff balls of acicular crystals in vugs. They are stained a bit from iron, but they have that soft, creamy look of aragonite. Another, from the Eifel Mountains in Germany could be a cluster of delicate flowers, and it is a favorite because it comes from Hall of Fame member Vi Anderson. A third is a single spray of icy clear aragonite needles hidden deep inside a vug from Sugar Grove in West Virginia.



*Aragonite, Eifel Mts, Germany Field of view 3 mm
Ex Vi Anderson from Weinbergers*

Calcite/high pressure, aragonite/low pressure: it makes such good sense, it must be wrong, and you don't have to look far to find trouble. In his book, *Mineralogy*, John Sinkankas notes "much stalactitic aragonite is really calcite." In the Sept./Oct. 2010 *Rocks & Minerals*, Alexandria Guth reports on her study of "aragonite" specimens from the A. E Seaman Mineral Museum collection. She found that of 61 specimens, one was natrolite, and 30 were calcite. Only 50 percent were true aragonite. Worse, quite a few specimens were mixtures, or they were calcite specimens with aragonite as a late-stage growth. She concludes that many of the cave formations were just assumed to be aragonite because of their habit and growth location.



Aragonite, Sugar Grove, WV. Field of view 4mm

Steve Voynick actually spells out a bunch of loopholes. Pressure isn't the only factor. Temperature also affects the size of atoms, not only because it affects the energy of the collisions with other particles, but because temperature is present as agitation among the atoms, and shaking up an atom affects the size of the electron cloud. Furthermore, higher concentrations of calcium ions favor the growth of calcite and lower concentrations favor aragonite. So some crystals begin growth as calcite, and as the calcium ions are used up the crystalization shifts to aragonite. That makes sense. Some of the minerals Guth tested were calcite with late-stage aragonite terminations.

So are my aragonites really aragonite? Voynick points out that aragonite isn't totally stable and will transform over time to calcite. That, he says, explains why there are so many calcite-after-aragonite pseudomorphs. It also explains why it's hard to tell what you have just by looking at it, even if you use a microscope.

This is getting complicated, and sometimes students complain about science because, they say, the more you learn about nature the more complicated it gets. But a lot of this aragonite story makes sense. In fact, the more you know about nature, the more it makes sense, and the simpler things get. Perhaps it would be better to say, the more you learn about nature the more *interesting* it gets. Take the case of aragonite.

Some Notes and Safety Tips on Using Oxalic Acid

by Duane Leavitt from EFMLS News, April, 2011. Reprinted with permission of the author.

One often reads about and sees reference to oxalic acid (wood bleach) in publications when the topic of cleaning minerals is discussed. This chemical, while an excellent cleaner for some types of minerals, poses some serious health risks which are not widely understood and can be confusing when considered in light of other acids that are sometimes used for cleaning purposes.

Oxalic acid, chemically $H_2C_2O_4$, is an organic acid, which means that it contains, among other things, the element carbon. At room temperature it is a white, crystalline, odorless, solid looking a lot like granular sugar in physical appearance. It melts at 101 degrees C and will vaporize at around 150 degrees C.

When we look at oxalic acid, strictly as an acid, we find that as acids go it is quite weak. Acid strength is measured by how much hydrogen acids give up in water solutions; a convenient measure of this is what is known as the K_a value, ionization constant value, of the acid. In a standard water solution oxalic acid has ionization constant (K_a) values of 0.0054 (primary) and 0.0000523 (tertiary). Compare this to K_a values of hydrochloric acid, $K_a = 1$; and nitric acid, $K_a = 27.79$ and it is obvious that oxalic acid is nowhere near as strong or as soluble in water as these last two acids, which are also used in mineral cleaning. This last statement is very true and is a BIG part of the problem with understanding oxalic acid. There is NO CORRELATION between acid strength and how poisonous it is, its TOXICITY.

As an organic acid, oxalic acid, and/or its water solutions, can be absorbed directly through the skin into the bloodstream, powders from the dry acid and vapors from solutions can be absorbed into the body through the lungs - this has serious implications for those who like to clean specimens in a crock pot of simmering oxalic acid solution in their basement; residues from improperly neutralized and rinsed specimens may be absorbed through later handling. Dust from the solid acid can damage the cornea of the eyes.

In the body, oxalic acid removes calcium from the blood, forming insoluble crystalline masses of calcium oxalate that eventually wind up in the kidneys where they will obstruct and abrade the kidney tubules causing the kidneys to bleed. They may block the kidneys and have to be removed surgically - kidney stones. In respiratory passages the material will cause severe irritation, possible hemorrhaging of these tissues and burns. When

the material gets into the digestive tract it causes severe gastroenteritis and vomiting, shock and convulsions, cardiovascular collapse and/or kidney failure which can lead to death. A lethal dose of oxalic acid is somewhere between 5-15 grams. Severe health problems occur at much smaller levels of exposure. OSHA recommends a TLV (threshold limit value) of no more than 1 mg (that is one thousandth of a gram)/ cubic meter. For comparison, 1 restaurant packet of sugar contains about 1 gram of material or 1000 times the recommended exposure value.

Unlike neutralized hydrochloric, muriatic and nitric acids, the products of "neutralized" oxalic acid are STILL poisonous - they just are no longer acidic. Oxalate compounds of any nature are still a threat to your health.

People wishing to use oxalic acid can do so successfully and safely provided they incorporate the following procedures into their mineral cleaning:

1. Always use long-sleeved rubber gloves, a splash proof apron, and full eye/nose protection when handling either dry oxalic acid crystals or oxalic acid solutions.
2. Avoid heating solutions of oxalic acid.... it will work cold, it just takes longer.
3. Keep containers of soaking specimens covered so that acid vapors stay inside the container. Lids should NOT be airtight.
4. Rinse any specimens cleaned with oxalic acid with copious amounts of water and test with pH paper to ensure that all acid is gone. A post treatment bath in dilute (household) ammonia or sodium bicarbonate solution is a good idea.
5. In the event of a spill removed affected clothing immediately, rinse affected areas with copious amounts of water, rinse and wash affected clothing. If there is any doubt as to the severity of the exposure seek medical help immediately.
6. Small amounts of used solutions of oxalic acid can be disposed of by the following method: 1.) Neutralize the solution with sodium bicarbonate or sodium hydroxide; TEST with pH paper to make sure it is neutral (or slightly basic). 2. Dilute the solution from step 1 above, 20 fold with water (example, to 1 pint of neutralized acid solution add 20 pints of water. 3.) Pour solution 2 down the drain with plenty of cold water. This disposal technique is identical to Flynn Scientific disposal technique 24A (Flynn, 2006).

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The Conglomerate

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12,000 Carat Tanzanite Discovered

from Jewelers Circular Keystone Online

TanzaniteOne Ltd. has announced the mining of a 12,000 plus carat tanzanite at its mine in the Simanjiro district of Tanzania. Company officials believe that it is the third largest tanzanite recovered at the mine and possibly the third largest ever found.

The rough will now undergo evaluation to determine grading for color and clarity. Initial examination indicates that it probably contains a significant amount of A grade material.

The rough will most likely be divided into smaller, but still large, pieces which will be faceted at TanzaniteOne's in-house cutting facility.

[Ed. Note: At press time very little about this particular gemstone was available. From what I've been able to learn, Tanzanite is usually a reddish-brown in its natural state and heat treated to obtain the blue-violet color for which it is known. Heat treating usually is done after cutting is done so that the stone being heated does not

contain fractures that could cause the rough to explode during the process. Based on this information, it appears that this stone is one of the rare ones that does not need "cooking".]



Oxalic Acid

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7. Read up on cleaning techniques (Cleaning and Preserving Minerals by Richard Pearl is a good place to start) and educate yourself about techniques, materials and alternatives.