MICROMOUNTERS OF NEW ENGLAND NEWSLETTER

The MMNE was organized on November 8, 1966 for the purpose of promoting the study of minerals that require a microscope

No. 234 January 2002

Next Meeting
Saturday, Jan. 12
Northboro, MA
Public Library
Doors open @
9:30am

Map and directions are on the back page

Membership dues are $10/person or $15/family for the calendar year, payable on Jan. 1 for the year
Mail dues to the Membership Chairperson
Brian Porter
355 Walsh Ave.,
Newington, CT 06111

MEMBERSHIP NEWS

Dear Members,

Another year has passed for the MMNE, and I wanted to say Happy Holidays to all of the membership. Firstly, I want to apologize for not sending out the application for the 2002 membership earlier than the January Newsletter. I was just coming back from my honeymoon and didn't make the cutoff date for the November *Newsletter*. Secondly I am extending the date for dues to January 15, 2002 instead of January 1, 2002 because of the November *Newsletter* not containing the application. Hopefully I will be a little more organized next year, and I will get the application out as expected. Next I would like to welcome our newest member Harve' Cantor from Sicklerville, NJ. Welcome to the best Micromounting Club in the World. Lastly, I would like to say thank you for the beautiful wedding card I received from the members and a special thank you for Pat Barker for organizing it and sending it. It was such a great surprise. See you all at the meetings and have safe and happy holiday season.

Thank You,

Brian Porter
Membership Chairperson

A Useful Scope Tip - Literally

From the Mineral Mite, April 2001

Member Jack Nelson complained to Jennie Smith a few months ago that he had been scratching the lenses of his glasses on the eyepieces of his microscope. Here was her "tip". Take a medical rubber glove and cut two one inch long lips off the fingers. Then cut the tiniest bit off the tip of each of them. Pull them, big end first, over the eyepieces. The tiny hole you cut in the tip will expand enough to expose the lens, and leave you with two rubber-covered eyepieces that will not scratch your glasses!

FROM THE EDITOR

At the November meeting the membership opted to implement an increase in dues to $10 per person and $15 for a family membership. Review of expenses by the treasurer indicates that it costs between $10 and $11 per member to run the club. This includes the *Newsletter*, club insurance, rental of some facilities, donations to other free meeting places, etc. The May meeting is not the money maker it used to be and no longer can be counted on to support the club for the rest of the year. Family membership includes two adults and children living at the same address. Only one *Newsletter* will be sent for a family membership. A membership renewal form is included with this issue. Please fill this out promptly and return it to Brian Porter, 355 Walsh Ave., Newington, CT 06111.

On the back side of the membership renewal form is a questionnaire regarding the contents of the *Newsletter*. I need input from the membership regarding the contents of the *Newsletter,* so please take the time to fill it out. If you want to contribute something to the Newsletter, please let me know. Send the form to Brian Porter, and he will then get them to me.

Your treasurer, Anita Hubley, has indicated that some members are due reimbursements from the club for various expenses. These expenses need to be submitted to her **as soon as possible**. In the future these expenses need to be submitted promptly.

The GPS or **G**lobal **P**ositioning **S**ystem is one of the newer technologies which can significantly benefit field collectors in terms of both personal safety and collecting success. Your editor does not own one and knows essentially nothing about them. If any member can put together an article for the *Newsletter*, it would be greatly appreciated.

The *Newsletter* is the official publication of the Micromoounters of New England (MMNE). The last by-laws revision was 00/00/00. The MMNE is a member of the Eastern Federation of Mineralogical and Lapidary Societies (cf <http://www.amfed.org/efmls>) and the American Federation of Mineralogical Societies (http://www.amfed.org). Material from the *Newsletter* may be copied in other rock and mineral publications if credit is given to the author and the *Newsletter* unless the author has reserved all rights in which case written permission must be obtained from the author. If there are questions regarding copying please contact the editor. The club address is c/o the Editor. Meetings are held monthly September through May, except for December, and usually on an informal basis in July and August. Sites rotate and will be posted in the *Newsletter* as far in advance as possible. Visitors are welcome to attend all meetings. Bring a microscope and light source if you have one.

CALENDAR OF UPCOMING EVENTS

January 2002

12 Saturday - MMNE meeting at Northboro , MA public library. Doors open at AM

February 2002

1-3 37th Annual Pacific Micromount Conference Southern California Micro-mineralogists

23 Saturday - MMNE meeting at Chelmsford, MA public library. 9AM to 3:30PM.

April 2002

27 - 28 EFMLS Convention and Show Franklin, NJ

May 2002

3 - 5 CMMA Annual Conference, Brock University, St. Catherines, Ontario

18 Saturday - MMNE Annual Meeting, Moose Lodge, Marlborough, MA

WEB SITES AND OTHER REFERENCES OF MINERALOGICAL INTEREST

FREE DATA/DATABASES

Alkali-Nuts - Information on the minerals and Environment of Mont Saint-Hilaire,Quebec, Canada. Contains links

Athena Mineralogy - Pierre Perroud's searchable database. Contains mineral name, formula and systematic list only
<www.un2sg4.unige.ch/athena/mineral/mineral.htm>

Carbonate-Bearing Minerals. List of all known carbonate-bearing minerals
<http://wwwgly.uga.edu/railsback/CO3/CO3mins_intro.html>

WEB SITES AND OTHER REFERENCES OF MINERALOGICAL INTEREST

Continued from previous column

David Barthelmy's Webmineral database
<www.webmineral.com>

Ecole des Mines de Paris - Extensive listing of names origins and scientific references of mineral species.

Franklin Minerals - Listing of unique minerals found at Franklin and Sterling Hill, New Jersey

Frederic Biret's Mineralogy - Complete listings for crystallographic, optical and physical properties of minerals

GEOLIB - Mineralogy database as shareware from Norway
<http://www.geosystems.no>

MinAbs by Peter Susse - Shareware database drawn from the Mineralogical Abstracts up to (?) 1999. Contains about 20,000 entries.
<http://www.psusse.de/minabs.com>

MinMax Mineral Information - Database of minerals and localities in German and English
<www.zampano.com/minmax/index.php3lang=US>

Mindat -search by locality for species, or search by species for localities
<http://www.mindat.org>

Minerals of Australia and New Zealand. Guide to minerals and localities
<http://www.crocoite.com>

MINERALOGY-101: HOME LAB CHEMICAL TESTS

Part 3—*continued from the November Newsletter*

MAKING A MICRO-EYEDROPPER

You can buy eyedroppers with small diameter ends if you have a good chemical supply house in your area. But otherwise they can be hard to come by – and they aren't really "micro" eyedroppers. So you might want to try and make your own. Take an 8 inch length of glass tubing about the same diameter as a typical medicine eyedropper. Heat the center of it over a propane torch flame until it's soft. Then remove it from the flame and pull on both ends so the middle stretches out. Snap the middle – so there is a roughly 3 inch long thin capillary tube coming off the end of the unstretched part of the tube. Once the glass has cooled, then heat the wide end of the tube until it's soft and flare it slightly with the tang of a file – so it looks roughly like the top end of a regular medicine dropper. After it cools again, fit the flared end with a medicine dropper bulb.

If done right, you get an eyedropper that has a very thin capillary tube on its end – just right for creating microdrops of solutions. Actually, one length of tubing can give you two droppers if you do the stretching and snapping carefully – each half having a capillary tube on its end. If you make several of them you'll have enough to do testing without having to clean one between use in different solutions. Just make sure they – and all your glassware, etc. – get cleaned thoroughly between sessions. There's nothing like evaporated residue to botch up a test…

HEATING THINGS

First off, where a test calls for heating liquids on a glass microscope slide you need to be very careful. If you just stick the slide over the flame the odds are it will shatter. And you can't just try to hold it immediately above the flame – because that happens to be a pretty hot spot in the gas stream. You need to hold the slide "high" – two or more inches above the flame. There's enough heat at that point to slowly warm the slide, but not so much that it will heat the slide quickly and shatter it. I suggest you practice (with a broken half of a slide if you have a couple that you've dropped) and use tongs or pliers to hold the slide in case it either gets too hot or breaks. But, when actually heating a slide during testing, I like to hold it in my fingers. If it starts getting too hot I know it immediately! :~} Basically such tests require that you *warm* the slide – not get it red-hot – in order to either promote evaporation of the liquid or hasten a chemical reaction. And you do so *gently* – not *strongly.*

Heating solutions in a test tube is less of a hassle – they are designed to be heated, even *strongly.* So you shouldn't have to worry about them shattering when you put the heat to them. But you do need to worry about following the instructions for a test – not heating something strongly when the test calls for gentle heating. Again, you are usually trying to either evaporate the liquid or hasten a reaction in it.

Gentle heating calls for pretty much the same approach as handling slides.

Again, I hold the tube in my hand, tipped at an angle, and don't let it get too hot to hold – keeping my fingers below the rim so they aren't in the path of any fumes issuing from the mouth of the tube.

Heating strongly requires a different approach. Here you want to put the heat to the tube – but without actually bringing the contents to a boil. If you experiment a little you'll find that there is a curious phenomena which occurs when you heat a test tube: Just before the liquid comes to a boil the tube begins to vibrate. So what you do is heat the tube until you feel the vibration, then remove it from the heat for a few seconds. Then put it back over the heat until it vibrates again. And so on until you've achieved your purpose. After a while you'll probably find yourself sort of waving the test tube over the flame, keeping it just shy of boiling by dipping it in and out of the flame with a continuous motion. Perfect!

DO NOT BRING ACIDS OR ACID SOLUTIONS TO A BOIL! You may only be working with a few drops of solution, the danger relatively low, but – believe me – you do not want to risk boiling off an acid all at once and getting a whiff of the fumes. Or getting them in your eyes! (While there is still some risk in slowly evaporating acid solutions, the fumes produced are much more dispersed and "diluted" with air.)

A few tests require heating the tube containing the test solution in a boiling water bath. This means heating a beaker of water to a boil and suspending the test tube in it for whatever time is required. A neat trick is to bend a medium or large sized paper clip so one part forms a test tube holder and the other part forms a "hanger" that can be hung on the edge of a beaker. Then you don't need to hold the tube in the water by hand in a test tube holder.

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SILICATE FUSIONS

As noted above, most silicate minerals will not dissolve in the acids you can use safely in a home lab. Some amateur mineral chemists avoid trying to test silicates for this reason. But there is a method for freeing up the metallic ions in silicates that can be done in the home lab. It is a bit tricky – and it won't work for all silicates - but with a little practice most people should be able to become proficient at it and thus expand the list of minerals they can test. All it takes is sodium carbonate (Na2CO3), charcoal blocks, and a propane torch or blowtorch. It's a bit messy, but you can use charcoal briquettes in place of charcoal blocks – you just have to scrape a flat on one side to provide a stable base, and then gouge a small hollow in the opposite side. Make sure the hollow is large enough to hold all the powder mixture you want to fuse. (It's better to fuse several small batches than to try for one large one.)

Mix a pinch of powdered silicate mineral with about four or five times that amount of sodium carbonate powder. Place the powder mixture in the hollow on the charcoal block (or briquette). Then heat the mixture with the blue flame of the torch until it fuses into a solid globule on the charcoal. Once the globule cools, crush it back into a powder. This powder should be dissolvable in hydrochloric acid – and the resulting solution useable in a variety of tests for metallic ions. (If you find the powder does not dissolve, try another fusion – perhaps using a smaller amount. Sometimes it takes a couple tries to get a good fusion. If after several tries you can't get a powder that dissolves, you've probably come upon one of the silicates that's difficult to fuse or won't fuse at all. That can be useful info in itself.)

QUANTITIES & MEASUREMENTS

I tend to think – and talk – in terms of "pinches" of powders and "drops" of liquids. But what's a "pinch"? A "drop"? I have a tiny lab spoon that holds about ¼ of the volume of a Bayer aspirin. Maybe something like 5 to 7 milligrams. I call that a "pinch." A "tiny pinch" is what I can pick up with a pair of small tweezers and tap off into the slide depression or test tube – maybe half a "pinch" or less. A "drop" is what drips out of the end of a lab eyedropper when you squeeze the bulb just enough to form a bead of liquid at the end that is big enough to drop off under its own weight. Don't ask me what that is in milliliters... (The micro-eyedropper is used for producing tiny drops when you only have tiny amounts of mystery mineral powder to work with, or when you need to slowly add solutions to achieve a desired degree of acidity or alkalinity.)

Just thought we ought to define these – ahem! – highly technical and precise terms before moving on. :~}

Also, this points out the fact that most qualitative testing for minerals is not really all that persnickety when it comes to measurements. You don't usually need precisely controlled amounts of powders and liquids to get useable results. (Though some tests do require measured amounts.) In quantitative tests measurements become more of an issue. But we're only talking rough quantities here – when we talk about them at all. So you don't have to get all in a lather about making sure you use exactly the right amount of this to make that work.

(The next piece is a comment posted on the website by MMNE member Dana Morong)

Re: Mineralogy-101: Chemical Tests - Part 3

Ingenious micro eye-dropper! I ought to print this one out for posterity. Incidentally, a regular drop from a regular eye-dropper is usually about 1/20 of a milliLiter (calibrate yours by finding something to measure in, such as a measuring spoon, see whether a teaspoon says 5 mL or not, and count the drops that fill it to level - or use a small graduated flask).

Your hints on general procedures are also very helpful. I was recently looking at some micro Green crust, composed of very tiny micro crystals, from the Mascot Mine in Gorham, N.H. (a mine you well know). I got a slight bit of extra material to test, but can't see so well the tiny grains in bottom of test tube. However, a drop of acid in a depression in which a bit of the green powder previously dropped, shows No effervescence in acid (although same strength acid makes calcite fizz like crazy), but the green does dissolve and color the acid green. Hmm, may be copper but not a carbonate of copper (some carbonates need a slight warming of the acid to effervesce but copper carbonates generally do it in cold acid). May be a sulfate, or something else, must try other tests without getting mixed up with a bit of the primary sulfide, chalcopyrite, which forms the substrate upon which the green is (a test for sulfate in the presence of sulfide would be handy. The hepar reaction is obviously out, as that detects sulfur in any form, but the test with barium chloride might be useful, if I can manage it on a microscopic amount of sample (hmm, must make those two micro-droppers, maybe use microdrops on a slide under the microscope - hmm, cover slip to protect microscope from acid fumes?).

Continued On page 5

(This is the beginning of the specific chemical test section. Ed)

CHEMICAL TESTS, Part-1

[Note: In some cases two or more tests are offered for a given element, etc. This should help you in a couple ways: 1) You can try each test to confirm results, and 2) you might have chemicals for one of them, but not the others.]

Aluminum (Al): Dissolve a tiny pinch of powdered mineral in a few drops of acid. Add several drops of sodium hydroxide solution (NaOH) to the solution to make it alkaline. (Use litmus paper to determine alkalinity.) If Al is present a white precipitate of Al(OH)3 gel will form, and then re-dissolve. [WARNING: NaOH is extremely caustic. Use with all due precautions.]

Aluminum (Al): If the powdered mineral is pale in color or white, strongly heat a pinch of it in a test tube; then cool and add a few drops of cobalt nitrate solution (Co(NO3)2.6H2O) and reheat. If the powder turns blue there is Al present. (Same test shows Zn or Mg in some minerals.)

Antimony (Sb): Dissolve a pinch of powdered mineral in a few drops of hydrochloric acid (HCl). Slowly add micro-drops of ammonium hydroxide (NH4OH) until the solution is just slightly alkaline. Then add micro-drops of HCl until the solution becomes just slightly acidic again. (Use litmus paper to gauge alkalinity vs. acidity.) Then add one or two drops of freshly prepared sodium sulfide solution (Na2S). If an orange to reddish brown precipitate forms, there's Sb in the mineral. (Always prepare fresh Na2S solution – it decomposes over time, old stuff isn't any good.) [WARNING: NH4OH is extremely caustic. HCl is a strong acid. Use both with all due precautions.]

Antimony (Sb): Another test is to place a drop or two of the test solution prepared in the above test onto a small shaving of tin (pure tin – not an alloy) and see if Sb forms on the surface as a black powder.

Antimony (Sb): Yet another test is to dissolve a pinch of powdered mineral in a few drops of HCl, lower a shiny steel brad into the solution, heat gently, and see if the black powder of Sb forms on the shiny surface of the brad. [WARNING: HCl is a strong acid. Use with all due precautions.]

Aragonite vs. Calcite: Add a pinch of powdered mineral to a few drops of cobalt nitrate (Co(NO3)2), boil until liquid is nearly gone. Cool and rinse thoroughly in water. If the powder is stained pink it's aragonite. If it isn't, it's calcite. (This assumes you have narrowed the choices down to one or the other.)

Arsenate (AsO4): Make a fresh solution of tin chloride (SnCl2) by adding shavings of tin to a few drops of HCl and heating gently until the tin is dissolved; then add several drops of a solution of fresh ammonium molybdate and powdered mineral. If the solution turns deep blue, there's AsO4 present. (This test also works for phosphate – PO4.) To confirm AsO4 – as opposed to PO4 – first make a solution of distilled water and sodium carbonate (Na2CO3), slowly add the carbonate solution to the test solution until there is no effervescence. Check to make sure the solution is neutral to litmus paper. Then add one or two drops of silver nitrate solution. If AsO4 is present a reddish-brown silver arsenate precipitate will form. (Silver phosphate is yellow, as is silver arsenite.) (Note: Remember to always mix fresh ammonium molybdate solution and fresh tin chloride solution. Old stuff decomposes and isn't any good.)

Barium (Ba): Dissolve a pinch of the powdered mineral in a few drops of HCl and add a drop or two of sodium sulfate (Na2SO4) to the mineral solution. A white precipitate of barium sulfate (BaSO4) will form if there is Ba in the mineral powder. (Same test will show calcium (Ca) as a white calcium sulfate precipitate (CaSO4) and strontium (Sr) as a white strontium sulfate precipitate (SrSO4).)

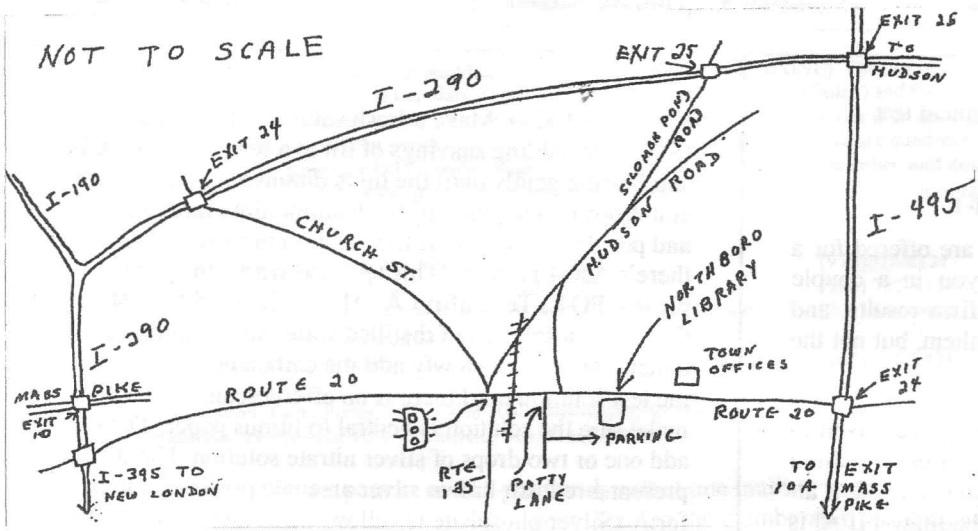
Barium (Ba): Dissolve a pinch of powdered mineral in a few drops of acetic acid (CH3CO2H), add several drops of potassium chromate (K2CrO4). If Ba is present a precipitate of yellow barium chromate will form. (Use approx. double the number of drops of potassium chromate solution as the number of drops of acid solution.) (This test will not work for all Ba minerals. If the powder will not dissolve in acetic acid, you need to use a different test.)

Bismuth (Bi): Make a slightly acid test solution of powdered mineral. Add several drops of NH4OH to a few drops of the test solution. If Bi is present it will form a white precipitate of bismuth hydroxide (Bi(OH)3). (This same test can be used for cadmium and tin – see below and next post.)

Bismuth (Bi): Use the same test solution described in the above test. Add freshly prepared Na2S solution. If Bi is present a dark brown precipitate of bismuth sulfide will form.

Boron (B)/Borate (BO3): Dissolve a pinch of powdered mineral in two or three drops of sulfuric acid, then add an equal amount of alcohol. The solution will burn with a bright green flame if B is present. (Really a "flame test" – sorry for snitching it, Al. :~})

To be continued next issue with more specific tests



Northboro, MA public library

The distances are somewhat distorted for clarity. Follow the directions below:

FROM MASS PIKE WEST: Take exit 10 to I-290 through Worcester, then exit 24 (Rte 20) to Northboro.

FROM I-495 SOUTH: Take exit 24 (Rte 20) west to Northboro.

FROM I-495 NORTH: Take exit 25 (I290) to exit 25 (Solomon Pond Rd.) to Northboro.

At Northboro follow map to Patty Lane off Rte 20 between the library and the RR tracks. Follow Patty Lane to left and turn into library parking lot. Enter the meeting room through the rear door at parking lot level.

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