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. 235 February 2002

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2001-2002

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Next Meeting
Saturday, Feb. **23**
Chelmsford, MA
Public Library
Doors open @ 9AM

Map and directions are on the back page

Dues are $10/person or $15/family for the calendar year, payable by Dec. 31 for the new year.
Mail payment to the Membership Chairperson
Brian Porter
355 Walsh Ave.,
Newington, CT 06111

MEMBERSHIP NEWS

Dear Members:

I want to elaborate on the new membership dues and what each category represents.

Individual Membership - dues are $10 and the member receives the *Newsletter*, a membership card, and rights to all club activities.

Family Membership - dues are $15 and all members must reside at the same address. The primary member will receive the *Newsletter*. All members will receive membership cards and rights to all club activities. (Additional copies of the *Newsletter* to the same address require separate individual memberships.)

Life membership - no membership dues. The life member will receive the *Newsletter* and a one-time membership card plus rights to all club activities.

I hope this explains the membership. See you at the next meeting.

Brian Porter
Membership Chairperson

Note: Memberships run from January 1 to December 31 regardless of enrollment date. Dues for the new year are payable in advance by December 31. Members who have NOT paid their dues for the new year will receive the *Newsletter* for January since it is mailed in December, but that will be the last issue sent until the dues for the new year are paid. There is a date on the mailing label which shows the paid up status of the member receiving the *Newsletter. Because the renewal notices were sent late this year, there will be a grace period for the Newsletter through the March issue.* Additional copies of the *Newsletter* may be obtained from the editor for $1.00 each including postage. Ed.

MINERALOGY 101 - CHEMICAL TESTS, Part 1 *continued from January Newsletter*

Cadmium (Cd): Dissolve a pinch of the powdered mineral in a few drops of acid (HCl, nitric, etc.) and add a few drops of sodium sulfide solution (Na_2S). If Cd is present it will produce a bright yellow precipitate of CdS (which happens to be the mineral greenockite!)

Cadmium (Cd): Use the same test solution described in the above test. Slowly add drops of NH_4OH to make the solution slightly alkaline. If Cd is present it will form a white precipitate of cadmium hydroxide. The precipitate will re-dissolve if you add more ammonium hydroxide. (This same test can be used for lead and bismuth, but they will not re-dissolve in an excess of NH_4OH.)

Calcium (Ca): Same test as first test for Ba, will produce a white precipitate of calcium sulfate ($CaSO_4$.)

Calcium (Ca): Another test is to dissolve a tiny pinch of the powdered mineral in a drop or two of acid, then make the solution alkaline with a few drops of ammonium hydroxide solution; then add ammonium oxalate solution $[(NH_4)_2C_2O_4.H_2O.]$ If Ca is present in the mineral solution it will produce a white calcium oxalate precipitate (CaC_2O_4.) (Same test will show Ba as white barium oxalate precipitate, and Sr as white strontium oxalate precipitate.)

Carbonate (CO_3) & Carbon dioxide (CO_2): Most carbonate minerals bubble ("effervesce") when acid is added to them – even un-powdered – due to the reaction giving off carbon dioxide. Calcite even effervesces in vinegar (a weak acid) a little bit. Powdered, it will effervesce in Coke,

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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 h 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.

Officers for 2001/2002

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Dues are $10 per year per person or $15 per family (all at one mailing address) and payable to the MMNE on January 1st of each year. Memberships run from January 1 to December 31 regardless of enrollment date. Send to the membership chairperson.

CALENDAR OF UPCOMING EVENTS

The North Shore Rock & Mineral Club Micromounters meet the 2nd Wednesday of every month at the home of John and Margaret Stewart, 244 Mill Street, Burlington, MA. Call (781) 272-0854 for more information.

February 2002

1-3 37th Annual Pacific Micromount Conference
Southern California Micro-mineralogists
15 Arthur T. Roe Micromount Symposium at the Tucson Gem and Mineral Show
23 - Saturday - MMNE meeting at Chelmsford, MA public library. 9AM to 3PM.

March 2002

9 - Saturday. 26th Micromount Show. 10AM to 3PM.
Rock & Mineral Club of Lower Bucks County, PA
Contact Richard Tillett, Croydon, PA (215) 785-2642
23 - Saturday - MMNE meeting at Westford Public Library. Doors open at 10AM

April 2002

5-7 30th Annual Atlantic Micromounters Conference.
Tyson's Westpark Hotel, McLean, VA. Contact
Steve Weinberger, PO Box 301, Glyndon, MD 21071
18-21 29th Rochester Mineralogical Symposium
Contact: Dr. Helen Chamberlain, PO Box 85
Manlius, NY 13104-0085
20 - Saturday - MMNE meeting at Shrewsbury, MA Public Library.
27-28 EFMLS Convention and Show, Franklin, NJ

May 2002

3-5 CMMA Annual Conference, Brock University,
St. Catherines, Ontario
4-5 39th Annual New England Gem a& Mineral Show
North Shore Rock & Mineral Club, Topsfield Fairgrounds,
Rte 1N, Topsfield, MA
18 Saturday - MMNE Annual Meeting, Moose Lodge,
Marlborough, MA

WEB SITES AND OTHER REFERENCES OF MINERALOGICAL INTEREST

"Mineral Tack" is available from David Shannon Minerals. This is now a neutral off-white color not the old blue tack. It seems to last better and dry less than the blue (personal experience, Ed). The tack is available in 75 gram packs at $2.25 each with 20% off for 10 packs ($1.80 each) and 50% off for 100 packs ($1.10 each.) It is also is available in 1 kg. bulk rolls @ $19.95 each. Contact: David Shannon Minerals, 6649 Rustic Drive, Mesa, AZ 85215. (480) 985-0557 (phone/fax).

LIMITED BIBLIOGRAPHY FOR QUALITATIVE CHEMICAL TESTING

Dunn, P.J. Mineral Identification in the Home Laboratory: Some Useful Techniques: *Min. Rec.* 24:3-10 (1993)

Pearl, Richard. *Mineral Collector's Handbook*. Mineral Book Co. (1947)

Pough, Frederick H. *A Field Guide to Rocks and Minerals*. Houghton, Mifflin. 4th Edition (1976)

Rogers, Austin F. *Introduction to the Study of Minerals.* Reprinted by AMS Press. 3rd Edition (1937)

Smith, Orsino C. *Identification and Qualitative Chemical Analysis of Minerals.* Van Nordstrand. 1946 and 1953.

A more comprehensive and extensive bibliography (with comments) can be found in *Mineral News*, October 1994 and March 1995 by Dana Martin Morong.

WINTER COLLECTING SAFETY TIPS

News from the EFMLS (November 2001 edition)

By Bill Klose, EFMLS Safety Chairman

By now most areas will have had their first snowstorm of the season, but the undaunted rockhound will continue to venture out until the ground is frozen or snow covered. The following article comes originally from Chapter 16 of the EFMLS Safety Manual with some editorial additions by Bill Klose. A few comments by your editor (MMNE) are in brackets [ ].

FROST BITE

Frost bite is a condition characterized by the cutting off of circulation to and possible destruction of superficial tissues, resulting from exposure to cold - especially moist cold in the .... hands, feet, ears, nose, and other exposed areas of the body. The wind (or wind chill factor) can add to the effects of cold temperatures, ***even when above freezing***. Symptoms of frostbite begin as a prickly feeling on exposed areas of the skin followed by numbness and waxy looking patches.. Blanching or redness (erythema) of the affected area is prominent initially. Later, edema [swelling] and superficial blisters develop and may break down … [to] form superficial ulcers ... or gangrene. Severe pain is associated with this condition.

"TREATMENT:" Prevention is more important … [than treatment and is accomplished by] avoiding undue exposure to cold without adequate protection. … Keep warm, keep moving, and keep dry. Dress in loose layers of warm, waterproof clothing that cover exposed areas. Warm gloves and a hat are essential. Up to 80% of the body's warmth can be lost through an uncovered head. [You and your collecting companion should frequently check each other for evidence of frost-bite on the face and ears.]

"ACTIVE TREATMENT:" The affected parts are to be well dried and wrapped in protective cloth or cotton, (or tuck the hands into the armpits) and allowed to gradually come up to normal or room temperature. Application of heat or direct cold is contraindicated. (Do not rub or apply snow to the frost-bitten area. The affected area can be placed in water a little above body temperature (not above 104 degrees F). Do not place hands under running water, as there will not be any feeling initially, so they could become burned. As the frost-bitten area "thaws" it is normal to feel pain or a burning sensation. If blister formation results (do not break them), or the frost-bite is severe, medical attention should be sought.

Continued from the previous column

HYPOTHERMIA

[Hypothermia is the loss of body heat with secondary lowering of the victim's core body temperature which can become life threatening if unrecognized and/or untreated.]

[CAUSES of HYPOTHERMIA or] "MOUNTAIN SICKNESS:" Exposure to the cold is the precipitating factor. The main contributory factors may be contact with wetness or inadequate clothing. Predisposing factors may be alcoholism or an underlying vascular or systemic disease such as diabetes or poor circulation [these also contribute to frost-bite.] People taking beta-blockers to lower blood pressure are especially at risk. The young and the old are especially vulnerable.

"SYMPTOMS:" The symptoms are initially uncontrollable shivering with pale and numb skin … followed by abnormal behavior, weakness, stumbling and falling, leading eventually to collapse and stupor. In severe cases, the person will … [become] unconscious, and will have shallow breath[ing] and erratic heartbeat, … [followed by a weakening and slowing pulse rate].

"TREATMENT:" At the first signs of hypothermia, take the victim to a warm, dry place and give them hot liquids (***not alcohol!***). Clear and maintain airway if patient is unconscious. Prevent further heat loss by [the use of] blankets, warm rocks, or a companion in bed with the victim. A slow return to normal temperature is advisable. Get medical attention as soon as possible if the symptoms have gone beyond the shivering stage.

[REMEMBER: the onset of frost-bite and hypothermia are usually insidious and may not be noticed by the affected person. It can come on in temperatures above freezing particularly if the air is moist or there is a significant wind chill factor. It is imperative to do cold weather collecting with a companion and to monitor each other frequently. Carry warm liquids and a cell phone. Let someone know where you are going and when you will return.

Collectors with diabetes or poor circulation, as well as those taking beta-blockers (and these may include some eye drops for glaucoma) are at much higher risk for developing hypothermia.

Cotton is not a good material to wear in cold weather. It retains moisture and can contribute to hypothermia. The new synthetic fabrics such as polypropylene tend to wick moisture away from the body surface and allow evaporation. Hand and foot warmers will help protect fingers and toes.

Have fun but be safe! Ed]

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which has weak carbonic acid in it. Carbonates which do not effervesce in cold acids will do so if the acid is heated. [CAUTION: Never bring acids to a boil! The vapors can be deadly!] Some silicate minerals which contain carbonate will partially dissolve in heated acids, producing a gel or white powdery residue.

Chlorides/Chlorine (Cl): Most chloride minerals – such as halite ("rock salt") - will dissolve in water. Adding silver nitrate solution ($AgNO3$) will precipitate white silver chloride ($AgCl$.) The dried precipitate will dissolve in ammonia solutions. Any mineral powder which can be dissolved in nitric acid ($HNO3$) can be tested the same way. [WARNING: NHO3 is a strong acid. Use all due precautions.]

Chromium (Cr): Dissolve a pinch of powdered mineral in a few drops of acid (HCl or HNO3) and add several drops of NH4OH to make the solution alkaline. If Cr is present it will form a green precipitate of chromium hydroxide, which will not re-dissolve if excess NH4OH is added. To confirm, add a few drops of hydrogen peroxide and heat in a boiling water bath for several minutes to oxidize the Cr ion to CrO4, then add several drops of silver nitrate solution; CrO4 will precipitate with Ag to form brick red silver chromate.

Cobalt (Co): Dissolve a pinch of powdered mineral in a few drops of HCl, add several drops of NH4OH (until solution is slightly alkaline). If Co is present a blue precipitate will form – which is soluble in excess NH4OH, producing a brownish yellow solution. On exposure to air the solution turns red. (Note: the bead test for Co is much better. Al O. will cover that in his post on flame tests.)

Copper (Cu): Most copper minerals (other than silicates – and even some of them) will color HCl green. Powder the mineral and add a pinch to a few drops of acid in a small test tube. Many copper minerals won't bubble in the acid, but the acid will still turn green from the release of Cu ions.

Copper (Cu): Another test is to mix a tiny pinch of the powdered mineral in a few drops of HCl, then add several drops of NH4OH to make the solution strongly alkaline. If Cu is present it will precipitate as yellowish- to greenish-white Cu(OH)2 and then re-dissolve and color the solution bright royal blue.

Fluorine (F): Place a tiny pinch of the powdered mineral in the depression on a *new* (unscratched) glass slide. Add sulfuric acid (H2SO4) by the drop until the powder is just fully dissolved. Heat gently by holding the slide over a flame for several minutes. Cool the slide, then *thoroughly* wash it off and dry it. Check to see if the glass is etched – has fine little "scratches" or is "dissolved-looking." Etching indicates that the mineral has F, which was converted to hydrofluoric acid (HF) which in turn etched the glass. [WARNING: Hydrofluoric acid is *extremely* dangerous! It's fumes are deadly! Always do this test with the smallest possible amounts of the powdered mineral and sulfuric acid. Always do it in a well-ventilated area. Always use extreme caution not to spill the contents of the slide, or get it on you, your clothes, or the work area. Make sure the slide is thoroughly washed and dried before examining it closely for etching. (It is best to do the examination under the microscope – both to keep the slide away from you and to see the etching better if it's there.)] Alternate method: Once the powder and acid are mixed, set the slide aside in a *safe* place for several days (at least three, maybe a week) instead of heating it. After several days proceed as if the slide had been heated. Still use the same extreme caution – if there was F in the powder, the HF is still there… [CAUTION: You have to thoroughly rinse and dry the slide before you put it under your microscope. If there is even a trace of HF left it can form fumes and etch the objective lens of your 'scope. (That's the lens that's positioned right above the sample being examined…)]

Continued from previous column

Iron (Fe): There are several tests for Fe. One simple test is to dissolve the powdered mineral in either hydrochloric acid or nitric acid; Fe will turn the solution yellow. This will also work with lab grade oxalic acid (but may not with oxalic obtained from hardware stores, which is not lab grade and can cause yellow coloring due to impurities.)

Iron (Fe): Another test is to dissolve a tiny pinch of the powdered mineral in a drop or two of HCl or HNO3, then add several drops of NH4OH to make the solution alkaline, and see if reddish-brown iron hydroxide precipitates [Fe(OH)3.] (If you use HNO3 for this test and get positive results, the Fe is Fe+++ - see below for info on Fe of different valences.)

Iron (Fe): A third test (very sensitive) is to add a tiny pinch of the powdered mineral to a few drops of potassium thiocyanate solution (KCNS.) If Fe is present it will color the solution bright red. (This is used in dying agates red…)

[Iron has two "valance states" - Fe++ and Fe+++. There are tests which will determine which valence is present in a mineral. But be advised that some minerals have iron present in both valances.]

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Iron (Fe^{++}): Add a tiny pinch of the powdered mineral to a drop or two of potassium ferricyanide ($K_3Fe(CN)_6$) solution (water or acetone). If Fe^{++} is present it will yield a blue precipitate. (This is used for dying agates blue.) [WARNING: Any cyanide chemical is extremely poisonous! Use with all due precautions.]

Iron (Fe^{+++}): Same test as immediately above, but using potassium ferrocyanide ($K_4Fe(CN)_6$.) If Fe^{+++} plus is present it will yield a blue precipitate. [See WARNING immediately above.]

[In minerals containing Fe of both valances, it may be possible to judge which is more prevalent by the volume of the precipitate. In each test, add drops of the solution slowly – one at a time with a wait in between - until the reaction is driven to completion – no more precipitate forms (all of the Fe present is used up). Compare the amount of precipitate in each test tube. The one with the greater amount should be the one which is more prevalent. (Another very rough quantitative test.)]

Lead (Pb): Dissolve a pinch of powdered mineral in a few drops of HNO_3, add a drop or two of HCl. If Pb is present it will precipitate as white lead chloride ($PbCl_2$). To confirm, draw off the solution, leaving only the moist precipitate in the test tube, then add 3 or 4 drops of distilled water to the precipitate, then heat gently while stirring with a glass rod. $PbCl_2$ will dissolve in hot water. To confirm further, add 2 or 3 drops of potassium chromate – you should get a yellow precipitate of lead chromate ($PbCrO_4$) if there is Pb in the solution. If you get the precipitate, you've confirmed the presence of lead. (Note: The test up to heating in distilled water will also show Ag and Hg, but neither will dissolve in the heated water.)

Magnesium (Mg): 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 ($Co(NO_3)_2.6H_2O$) and reheat. If the powder turns blue there is Mg present. (Same test shows Al or Zn in some minerals.)

Magnesium (Mg): Another test is to dissolve a tiny pinch in a drop or two NH_4OH to make a strongly alkaline solution, then add a few drops of sodium hypophosphate solution ($Na_4P_2O_6.10H_2O$). If you get a white precipitate there's Mg.

Mercury (Hg): Mix a pinch of powdered mineral with a pinch of sodium carbonate powder ($NaCO_3$.) Heat strongly in the bottom of a test tube. If Hg is present it will form a silvery film on the wall of the test tube where the glass is still cool.

Continued from previous column

Manganese (Mn): Dissolve a pinch of the powdered mineral in a few drops of fresh sodium sulfide solution (Na_2S.) If Mn is present a pink precipitate of manganese sulfide (MnS) will form. When dried and exposed to air this precipitate will quickly turn brown and then black due to oxidation.

Nickel (Ni): Dissolve a tiny pinch of powdered mineral in a few drops of NH_4OH to make a strongly alkaline solution, add a few drops of dimethylglyoxime and alcohol solution (let's skip the formula for this one, it's a bear…) The presence of Ni will cause a red precipitate. (This is a fairly sensitive test for Ni.)

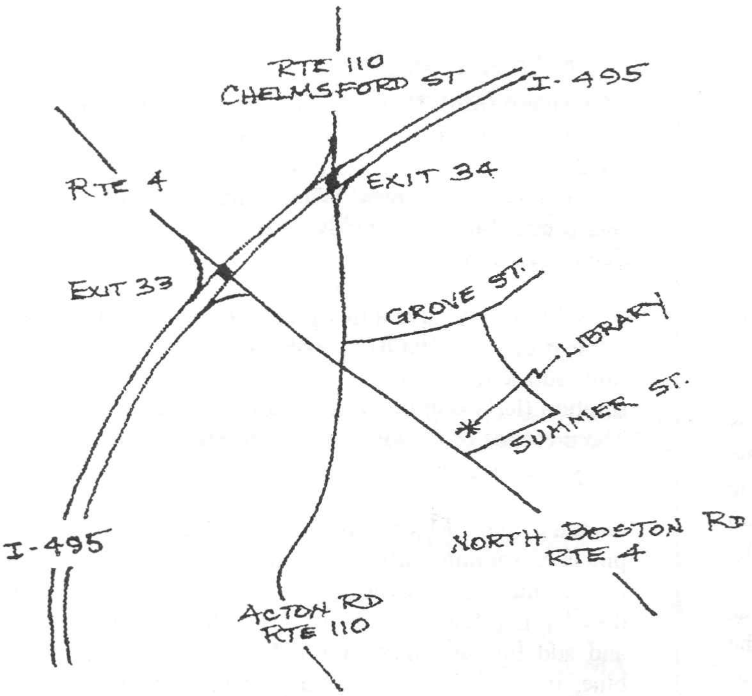
Niobium (Nb): Mix a pinch of powdered mineral with a pinch of sodium carbonate powder on a slide and fuse over a blue flame. Crush the melt back into powder and dissolve in a few drops of HCl. Heat the solution to a boil and add tiny shavings of tin. If the solution turns first blue, then brown, there's Nb present. [I know I said to never bring acids to a boil. Here's a test that makes you break the rule. Remember – you're doing it with a tiny amount of acid. So long as you don't sniff the stuff – or spill it! – you should be okay. Just make sure you are in a well-ventilated place – like outdoors…]

Phosphate (PO_4): Many phosphate minerals are rapidly etched by concentrated HCl – so a quick test for PO_4 is to put a drop or two of concentrated acid on a chip of the mineral and set it aside for a while – maybe half an hour or so. Then examine the chip to see if it is etched. (Note: Don't forget to examine the chip before you put the acid on it – so you know what it looked like and can compare that with how it looks after the acid has been applied.)

Phosphate (PO_4): Another test is to dissolve a pinch of powdered mineral in a few drops of HNO_3 and add a few drops of ammonium molybdate solution ($(NH_4)_2MoO_4$.) If it yields a yellow precipitate there's PO_4 present – the precipitate is ammonium phosphomolybdate.

Phosphate (PO_4): Another test is to make a fresh solution of tin chloride ($SnCl_2$) by adding shavings of tin to HCl and heating, then add a solution of fresh ammonium molybdate and powdered mineral. If the solution turns deep blue, there's PO_4 present. (This test also works for arsenate – AsO_4 (see previous post.) Since arsenates aren't as readily etched by HCl, doing both the etch test and this test will usually distinguish between the two.) [Note: Remember to always mix fresh ammonium molybdate solution and fresh tin chloride solution. Old stuff decomposes and isn't any good.]

(To be concluded next issue)



Chelmsford , MA
Public Library

MMNE Meeting Schedule

February MMNE meeting Saturday the 23rd
At the Chelmsford, MA Public Library.
Doors open at 9AM

March MMNE meeting Saturday the 23rd
At the Westford, MA Public Library.
Doors open at 10AM

April MMNE meeting Saturday the 20th
At the Shrewsbury, MA Public Library.

Annual MMNE meeting Saturday, May 18
Moose Lodge,, Marlborough, MA

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