The Apache Junction Rock & Gem Club, Inc.

# SMOKE SIGNALS

Dec 2012


| Officers of the Apache Junction Rock & Gem Club, Inc. | | |
|---|---|---|
| President: | Katy Tunnicliff | 918-440-9152 katydidnt2007@gmail.com |
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| Secretary: | Barbara Bayer | 480-832-3561 babrillhart@msn.com |
| Treasurer: | Mattie Gadd | 503-705-3933 mmpdg16@msn.com |
| Trustee: | Jack Pawlowski | 480-288-2642 j6ac5k@calcon.net |
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| Trustee: | Tom Sundling | 402-432-9790 ajroct@gmail.com |


The Club meets on the second Thursday of every month October thru April at 7:00 pm at the Carefree Manor RV Park, at the corner of Tepee & Delaware, Apache Junction, AZ

Club Dues - $24 a year per member prorated to first of month of joining. This may be paid at the general meeting or by mail to Ron Ginn, 691 N. Velero St., Chandler, AZ 85225.

## In This Issue



## Next Meeting – Jan 10, 2013

## Field Trips Planned

Dear Club members here are a few things that you requested. The
following are collecting sites and the specimens you can find.

Table Mesa Jasper/calcite
Sheeps Crossing Saganite
7 Springs Onyx/agate/jasper
Burro Creeek/Bagdad Pastelite/agate/ jasper/apache tears
Perkinsville/Jerome Agate/fossils/
Kingman Tavertine(onyx)
Globe Onyx/Serpentine
Diamond Point Crystals/Fossils
Black Canyon Jasper
Rim FR300/123 Chert/Fossils
Roberts Mesa Chert/Fossils
Brenda Jasper
Round Mountain Fire Agate/ Chalcedony

There are a few more sites that I will add in the future. Please consider leading a trip to one of these sites or your favorite site. I am also looking for experienced rockhounds to open your unused rock pile for a local trip.

## Minutes of Dec. Mtg.

Apache Junction Rock & Gem Club-General Meeting Minutes December 13, 2012
Submitted by Barbara Bayer
The meeting was called to order at 7:10 pm by the President. She led the Pledge of Allegiance.
Chris from Francis Electric was introduced and he opened the floor for questions. The main issue was the completion of the lighting, especially for the saw room. We can apply for retrofit funds once we receive our electric bill. Then rest of the lighting job should take about a week using the retrofit funds. The inspectors have already approved the electrical status.

- The Secretary's minutes for November 2012 were approved as presented in the Newsletter.
- Ms. Gadd presented the Treasurer's report as follows: Lapidary checking $1936.88 with $109.50 deposits and $2997.46 expenses (shop expenses $2044.7); Lapidary savings $58.54 with $335.50 deposits; General checking $530.37 with $269.00 deposits; General savings $121.32; Show

checking $6678.95; and Show savings $3763.04.

Committee Reports

- Membership: Mr. Ginn reported that we have 237 members of the club. Renewal total 30 members. If a member renews membership on Pay Pal, the fee is $25. Likewise, if lapidary shop annual fees are paid on Pay Pal, the fee is $72. The one dollar and two dollar increases are handling costs. The fees without Pay Pal are $24 and $70.
- Lapidary Shop: Mr. Stasi reported that we have having good usage of the equipment in the shop, although a few days have been slow. Afternoon and evening shop hours can be started once we have more monitors. Maps are available for the new shop. He thanks the approximately 35 members who devoted many hours to enable the new shop to be operational. There is a DVD available for instructions for cabochon making. Current charges for saw use are as follows: 10" saw no fee, 14" & 18" saw 15 cents per inch. The shop fee of $2.00/hour applies to actual working time, not waiting time. A budget for the operation of the shop can be installed once we get an electric bill. Examples of shop expenses include: 18" saw blade for $330, 24" saw blade for $670 and $2044 for items as blades, grinder wheels, oil, sanding belts, and glue.
- Flagg Show: Mr. Frlich circulated a time/day sign up sheet for volunteers for the club booth at this show. Ideally, there should be three persons at the booth to handle coupons and questions about our club. He stressed the importance as this is our main method of publicity for our own Rock Show. A coupon will reduce the entry price to our Rock Show by 50 cents per person- one coupon is good for a family/group.
- Rock Club Show: Mr. Frlich also circulated time/day sign up sheets for the volunteers for our show. Activities for this show include: raffle, Ming trees, silent auction, entrance table, membership table, and door security.

Elections: The following officers and trustee have been elected for 2012: President Katy Tunnicliff, Vice President Jerry Gervais, Treasurer Orlan Stone, Secretary Barbara Bayer, and Trustee Ted Montague.

We thanked Tom Sundling (Trustee) and Mattie Gadd (Treasurer) for the contributions for the club in 2012. They generously devoted many hours for the club.

Percy and Janet Kleinschimldt were introduced as the generous donors of the petrified wood. They shared their 40 year collection of the petrified wood.

Our speaker for the evening was Mr. John Hess of Carved in Stone. He gave an impressive presentation of a video of stone carving, samples of his work, tools for stone carving, and a description of the art of stone carving.

Door prizes were distributed. The silent auction was held. Gene Johnson won $39.00 in the 50:50 draw.

The meeting adjourned at 8:50 pm.

## Article of the Month

# The Most Common Minerals on Earth

*by Andrew A. Sicree*

### The most common minerals

A typical dealer's booth at a mineral show will display dozens if not hundreds of species of minerals. Many are rare – some are found only at a single locality. The very rarity of these minerals makes them desirable to collectors, but it also brings up a related question: Which are the most common minerals?

The crust and mantle differ from the core of the Earth in that the latter is nickel-iron while the former two layers are dominantly composed of silicate minerals. This might lead one to suspect that the most common minerals on Earth are silicates.

It is true that large portions of the Earth's surface are covered with carbonate sedimentary rocks (limestone and dolostone) and that these rocks are composed mainly of the carbonate minerals calcite and dolomite. But the total mass of carbonate rocks is small in comparison to that of the granites, diorites, gabbros, and basalts that make up most of the crust. On the other hand, much of the mantle is peridotite – a rock that is rather rare on the Earth's surface. Peridotites, granites, diorites, gabbros, and basalts are all silicate rocks, that is, they are made up of silicate minerals. So it indeed true that silicates are the most common minerals. But which silicate minerals?

The most common silicate minerals fall into eight mineralogical groups: the olivines, the pyroxenes, the amphiboles, the micas and clay minerals, quartz, the feldspars, the aluminum silicates, and the garnets. If you get to know these minerals, you'll be familiar with the vast majority of the minerals you will encounter in the field.

## The olivines

Look up the olivines, the pyroxenes, the amphiboles, and the micas, in a descriptive mineralogy text. At first glance, these minerals appear to be unrelated. But they become more understandable if you examine the silicon-to-oxygen ratios (Si:O ratios) of their chemical formulas.

Note that we use plural names like "the olivines." Olivine refers to a group of related minerals rather than a single mineral. The minerals forsterite, fayalite, and monticellite are in the olivine group. Likewise, the terms pyroxene, amphibole, or mica, refer to mineral groups rather than single species.

Most of the common olivines are part of the forsterite-fayalite series and are, appropriately enough, olive-green or dark green in color. Forsterite has the formula $(Mg)_2SiO_4$ and fayalite has the formula $(Fe)_2SiO_4$. These two minerals form a *continuous solid solution series*, which means that magnesium (Mg) can substitute for iron (Fe) in the crystal structure. For instance, it is possible to have minerals with 50% Fe and 50% Mg, or with 30%Fe and 70% Mg. Any composition is possible between 100% Fe (with 0% Mg) and 100% Mg (0% Fe). In practice, one cannot determine the precise Fe:Mg ratio of a specimen without a chemical analysis. One usually sees a general formula for the olivines expressed as $(Mg,Fe)_2SiO_4$ because of the ability of Mg and Fe to substitute for each other.

Regardless of the percentages of magnesium and/or iron present, the Si:O ratio is 1:4 for all olivines. If you were to examine the structure of an olivine on the atomic level, you would find that each silicon atom is bonded to four oxygen atoms in a tetrahedral arrangement and that these tetrahedra are not bonded to each other, but rather are isolated from each other by magnesium and iron atoms. Thus, the olivines in general and the individual minerals such as forsterite, fayalite, and monticellite, are called island silicates or *nesosilicates*.

## The pyroxenes and the amphiboles

If the silicate tetrahedra are not isolated islands but rather are joined together at two of their corners, they can form long chains of silica tetrahedra and form minerals called *inosilicates*. A single chain of silica tetrahedra has a Si:O ratio of 1:3. A double chain (or band) of silica tetrahedra has a Si:O ratio of 1:2.75. The pyroxenes are single chain inosilicates, and the amphiboles are double chain inosilicates.

The pyroxene group includes minerals such as enstatite, hypersthene, augite, diopside, jadeite, and hedenbergite. Even spodumene, which has the formula $LiAlSi_2O_6$, is a pyroxene. Note that spodumene has Si:O ratio of 2:6, which is equivalent to a 1:3 ratio.

The amphibole group includes minerals such as tremolite and ferroactinolite and anthophyllite. Ferroactinolite has the formula $Ca_2Fe_5Si_8O_{22}(OH)_2$. The Si:O ratio of 8:22 translates into a 1:2.75 ratio.

At first, it is difficult to differentiate pyroxenes from amphiboles in hand specimens. One useful clue is found in their cleavages. On broken surfaces, both will display two cleavage directions. For pyroxenes the cleavage planes are usually at an angle of 87°-88° to each other – this is pretty close to 90°, so they will tend to look like they are at right angles to each other. In the amphiboles, cleavage planes are usually about 123° or 57° degrees to each other – amphibole cleavages are clearly not at right angles. And in general, amphiboles tend to occur as elongated, lath-like crystals while the pyroxenes more commonly occur as stocky crystals when they are found as euhedral crystals rather than in masses.

## The micas

Micas and the clay minerals are *phyllosilicates* or sheet silicates. Here, each silica tetrahedra is bonded to three others; a large number of tetrahedra will form a planar sheet made of hexagonal rings of silica tetrahedra. The Si:O ratio of a sheet silicate works out to 1:2.5. Phologopite, biotite, muscovite, and other micas are all phyllosilicates. (Not all layer silicates are micas. Talc is also a layer silicate, for instance.) The sheet-like arrangements of the silica tetrahedra are why micas will cleave into thin, flat sheets.

Although they are not as common as the major rock-forming silicates described above, there are two other classes of silicate minerals. These are the *sorosilicates* and the *cyclosilicates*. The sorosilicates have isolated pairs of silica tetrahedra and include minerals such as hemimorphite. The cyclosilicates have their silica tetrahedra arranged in rings. Beryl is an example of a cyclosilicate.

## The framework silicates: quartz

The final major class of silicate minerals is the *tectosilicates* in which the Si:O ratios are 1:2. In the tectosilicates silica tetrahedra are bonded together into three-dimensional frameworks. Quartz, with a chemical formula of $SiO_2$, is an example of a tectosilicate, as are the other silica minerals such as tridymite and cristobalite.

## The feldspars

The feldspars are also among the tectosilicates. In the feldspars, aluminum can take the same sites as silicon, so we look at both aluminum and silicon when calculating the "Si:O" ratio of 1:2. Two major groups of feldspars are the *alkali feldspars*, which have the general formula $(K,Na)AlSi_3O_8$, and the *plagioclase* series feldspars, which have the formula $(Na,Ca)(Al,Si)_4O_8$. Note that both series have two oxygen atoms for every silicon (and/or aluminum).

## The aluminum silicates

The aluminum silicates include common minerals such as staurolite, andalusite, kyanite, and sillimanite. (Chiastolite is a variety of andalusite.) Topaz is also an aluminum silicate. One should note that andalusite, kyanite, and sillimanite are polymorphs. They all share the same $Al_2SiO_5$ chemical formula, but the arrangement of the atoms is slightly different in each. These three minerals are found in aluminous rocks. Which mineral is found depends upon the temperatures and pressures to which the rock has been exposed. In general, kyanite is the high pressure form of $Al_2SiO_5$, sillimanite is the high temperature form, and andalusite is formed at lower temperatures and pressures.

## The garnets

Garnet is not a single species, but rather is a group of minerals that includes pyrope, almandine, spessartine, grossular, andradite, and uvarovite. The general formula for garnets is $A_3B_2(SiO_4)_3$ in which A could be calcium, magnesium, iron or manganese, and B could be aluminum, iron, or chromium. Note that the Si:O ratio is 1:4.

Apart from the fact that garnets can have just about any color imaginable, the garnet species are otherwise quite similar: they are hard, they are isometric, and they often occur as well-formed equant, almost ball-like crystals.

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# Talents and coppers: counting rocks

Way back in the days of the ancient Greeks, before the modern Geeks invented of the electronic calculator, early clerks used a "counting board" to tally up their accounts.

One of the few surviving ancient counting boards is the "Salamis Tablet." Made of polished marble, the Salamis Tablet has letters chiseled into it corresponding to the denominations of ancient coins, ranging from "T" for the *talent* down to "X" for the *chalkós*. (A *chalkós* is one-eight of the obol, which is one-sixth of the *drachma*, which is one-six-thousandth of a *talent*. Thus, there are 288,000 *chalkós* in a *talent*.)

The counting board was used by placing small rocks as counters above the various symbols for the various currency values. As one added or subtracted values, the counters would be rearranged. The counters were called *pséphoi* ("pebbles") and the word *pséphizein* meant "to compute" or "to calculate," but its literal meaning is "to pebble." Thus, an accountant is really a pebbler!

What is interesting to the mineralogist about this early system is that the word *chalkós* means "copper" or "ore." Is it just a coincidence that the smallest currency unit in ancient Greece was the "copper" and that today in the U.S., we use the copper penny as our smallest coin?

It is also interesting to note that some African societies traditionally used a form of copper money in which the copper metal was cast not into a coin but rather into a large "X"-shape about 10 inches (25 cm) across. Is this shape the source of the "X" symbol used for the *chalkós*?

*Ref:* Menninger, Karl, 1969, *Number Words and Number Symbols*, Dover, New York, p. 299-300.

# Rock Shows

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# Bench Tips

PICKLE PROBLEMS

Dropping a hot item into the pickle after soldering causes a hiss that sends small droplets of the acid pickle into the air. This will rust your nearby tools and can't be all that good to breathe either. My solution is to use a coffee cup of water next to my solder block to quench the piece before dropping it in the pickle.
Also, a hot pickle pot gives off fumes that bother me in my home workshop.
I get around that by using my pickle cold. I mix it a little stronger than with a hot pot so that it works about as quickly. I keep it in a large-mouth peanut butter bottle and cap it off whenever I'm done using it.

MODIFY TOOLS FOR PRONG SETTING

When setting stones in a prong mount avoid slipping by grinding a groove in the face of your prong pusher or one jaw of your flat-nose pliers.
Easiest way to cut the slot on the pusher is with a file., and the easiest way to cut the slot on your pliers is with a cutoff wheel in the Foredom.

USE A SPRAY BOTTLE

Those little spray bottles you can find at the drug store are great for firescale preventors and debubbling solutions. A quick firescale preventor is liquid flux, and a homemade debubbling solution is a little Dawn liquid in rubbing alcohol.

BROKEN DRILLS

Have you ever broken a drill bit off in a hole? Sometimes you can grab it with pliers, but other times the steel piece is below the surface in the hole.
If this happens, you can usually dissolve the steel in a solution of alum.
Alum is typically available from a food store or a drug store. Use about a teaspoon per cup of warm water. Submerge your piece so that the partially drilled hole is facing up to let the bubbles float free and not block the hole.

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