MINERALS - PROPERTIES AND IDENTIFICATION LAB

INTRODUCTION TO THE MINERALS - is a description of 30 important minerals for GLG 103. Each mineral species has its properties described, as well as a link to other images of that mineral. A geologic description of the particular image is also included. This group of pictures is intended to give you an overview of how the mineral may look in different geologic settings.

MINERALS TO IDENTIFY - is the identification of 20 minerals. It consists of an "interactive" PowerPoint that duplicates the lab setting. It allows you to perform tests on each unknown mineral and to make decisions as to its properties for the mineral's identification.

To assist you in your quest for mineral identification, an 8 page **MINERAL IDENTIFICATION KEY** is provided as a separate PowerPoint. It is required that you print this 8 page key (not the entire PowerPoint) and use it during the mineral identification process. You will enter your answers in the Mineral Identification Quiz in BlackBoard.

This is an interactive PowerPoint and it is intended that you click on various links throughout the lesson. However, if you do accidently hit a key it may advance to the next slide in the list, which may not be the one you want to observe. You can go back by using either the "**Backspace**" key or the link to "**Back to Page 1**" box in the bottom right hand corner of each page.

WARNING – This PowerPoint is over 200 pages in length so if you want to print out certain pages make sure to tell your printer which pages to print - not the entire powerpoint.

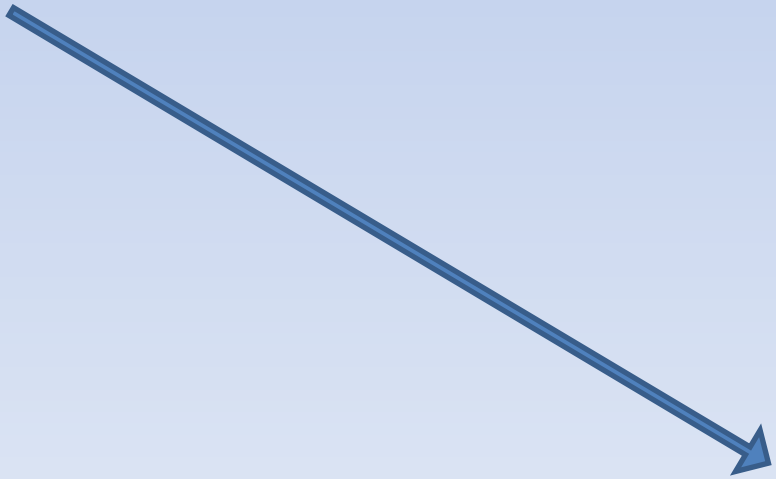
Introduction to the Minerals

Minerals to Identify

Links to other pages appear in yellow boxes with an orange outline (like this one).

Except this one does not go anywhere.

So… go back to page one
using this link.



Back to Page 1

INTRODUCTION TO THE MINERALS

ALPHABETICAL LIST OF 30 MINERALS

AMPHIBOLE GROUP	GARNET GROUP	OLIVINE
AZURITE	GOLD	ORTHOCLASE
BARITE	GRAPHITE	PLAGIOCLASE
BIOTITE	GYPSUM	PYRITE
CALCITE	HALITE	PYROXENE GROUP
CHALCOPYRITE	HEMATITE	QUARTZ
COPPER	LIMONITE	SPHALERITE
DOLOMITE	MAGNETITE	TALC
FLUORITE	MALACHITE	TOURMALINE
GALENA	MUSCOVITE	TURQUOISE

Each of these boxes is a link to images and information about that mineral species. In addition, each indicated image is linked to a You Tube video that shows the mineral rotating. I suggest expanding the viewing window and watching it at a higher resolution.

Back to Page 1

AMPHIBOLE GROUP (HORNBLENDE)

Click on picture for a YouTube link of mineral rotation.

As the mineral spins, note the flash of light coming off the two sets of cleavage faces. They are not at 90° angles to each other.

For another view of the two cleavage directions follow this **LINK**.

HORNBLENDE is not a recognized mineral name, but is included in this archive because of its common usage. The mineral described as hornblende is a member of the Amphibole group.

CHEMISTRY - $Na,Ca_2(Mg,Fe,Al)_5(OH)_2(Si,Al)_8O_{22}$

CRYSTALLOGRAPHY - Monoclinic

CRYSTAL GROWTH AND HABITS - Hornblende crystals are prismatic to columnar, stubby blocky, fibrous and fine to coarse grained. Crystals typically have a diamond shaped cross section.

COLOR AND OTHER OPTICAL PROPERTIES - Black, brown to dark green, translucent to opaque

HARDNESS - 6

SPECIFIC GRAVITY - 3.0 - 3.4

LUSTER - Vitreous to sub-vitreous

STREAK - White

BREAKABILITY - Hornblende has good cleavage in 2 directions (56° and 124°) producing diamond- shaped cross sections. It also has an uneven fracture and is brittle.

OCCURRENCE - Hornblende is widespread through igneous and metamorphic rocks, especially amphibolites.

ASSOCIATED MINERALS - Quartz, Feldspars, Muscovite, Biotite, Garnets

Link to other images of Hornblende.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AMPHIBOLE GROUP (HORNBLENDE)

Click on picture for a YouTube link of mineral rotation.

This is a cleavage fragment of Hornblende. As the light position is change the two distinct cleavage planes are visible. Click on the picture to see the change. HIT THE BACKSPACE KEY TO SEE THE PREVIOUS IMAGE.

Back to the Amphibole Group Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AMPHIBOLE GROUP (HORNBLENDE)

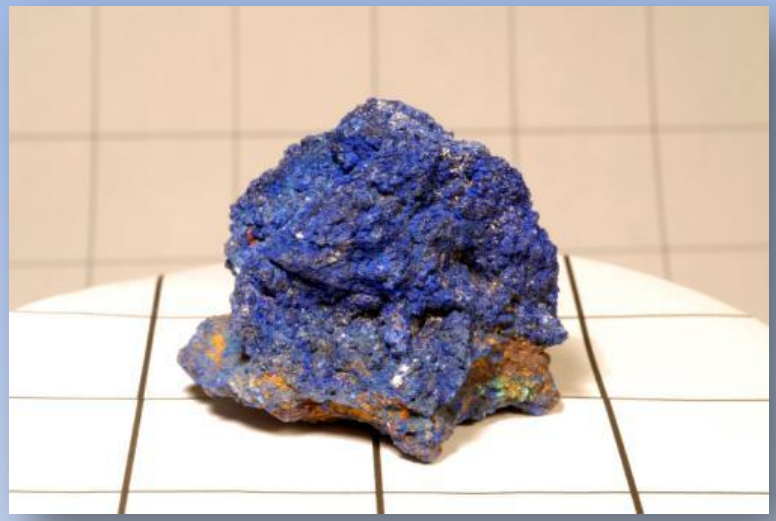
These are crystals (monoclinic) of an amphibole from Canada. They formed in a *skarn* and are associated with calcite (the light colored mineral). Skarns are deposits that form as an igneous intrusion comes in contact with a carbonate rock body, in this case a limestone or marble.

Back to the Amphibole Group Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AZURITE



Click on picture for a YouTube link of mineral rotation.

Color is a very useful property for the identification of Azurite. Note also the small amount of limonite (brown) and malachite (green) near the base of the specimen.

CHEMISTRY - $Cu_3(CO_3)_2(OH)_2$ Copper carbonate hydroxide
CRYSTALLOGRAPHY - Monoclinic
CRYSTAL GROWTH AND HABITS - Azurite is prismatic and typically found as well crystallized, equi-dimensional, deep blue crystals. Also found as rosettes, acicular masses, botryoidal masses and massive.
COLOR AND OTHER OPTICAL PROPERTIES - BLUE or some shade of blue.
HARDNESS - 3.5 - 4
SPECIFIC GRAVITY - 3.8
LUSTER - Vitreous to dull
STREAK - Blue
BREAKABILITY - Brittle
OCCURRENCE - Found in the oxidized zone of copper. bearing sulfides. Commonly found in vugs or pockets within spongy masses of limonite.
ASSOCIATED MINERALS - Very commonly found with malachite, limonite and chrysocolla.
MINERAL NAME - Named for its blue (azure) color.

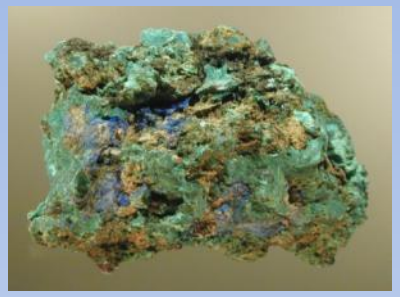
Link to other images of Azurite.

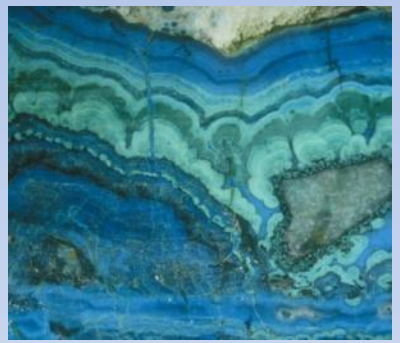
BACK TO THE ALPHABETICAL LIST OF MINERALS

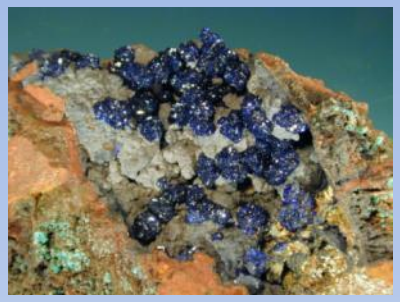
Back to Page 1

AZURITE

Each image can be “clicked” for more information.







Back to Azurite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AZURITE

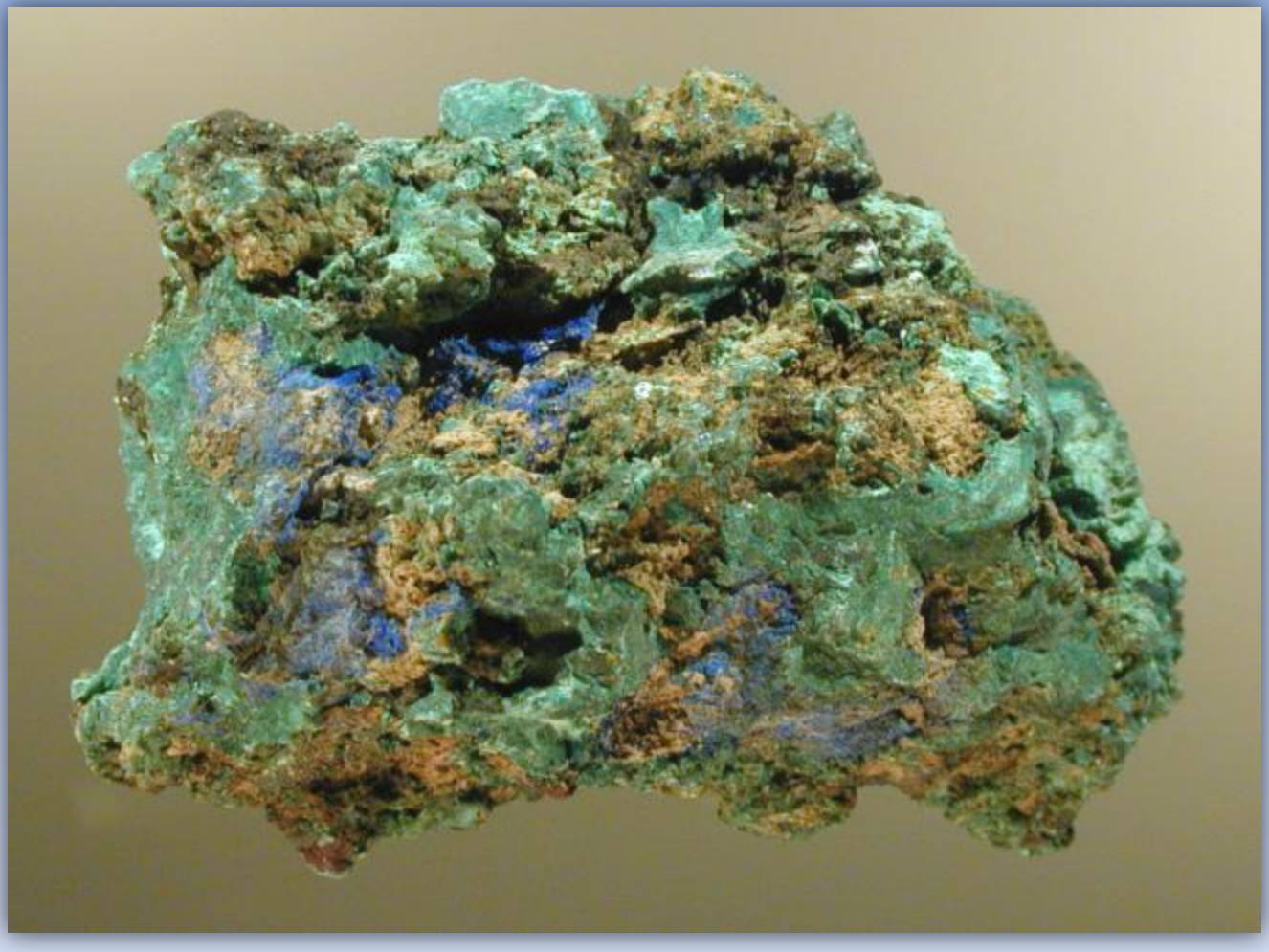
This specimen shows a concentric growth pattern (similar to malachite), clearly visible in the broken nodules. Note also the association with the light brown limonite.

Back to Azurite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AZURITE



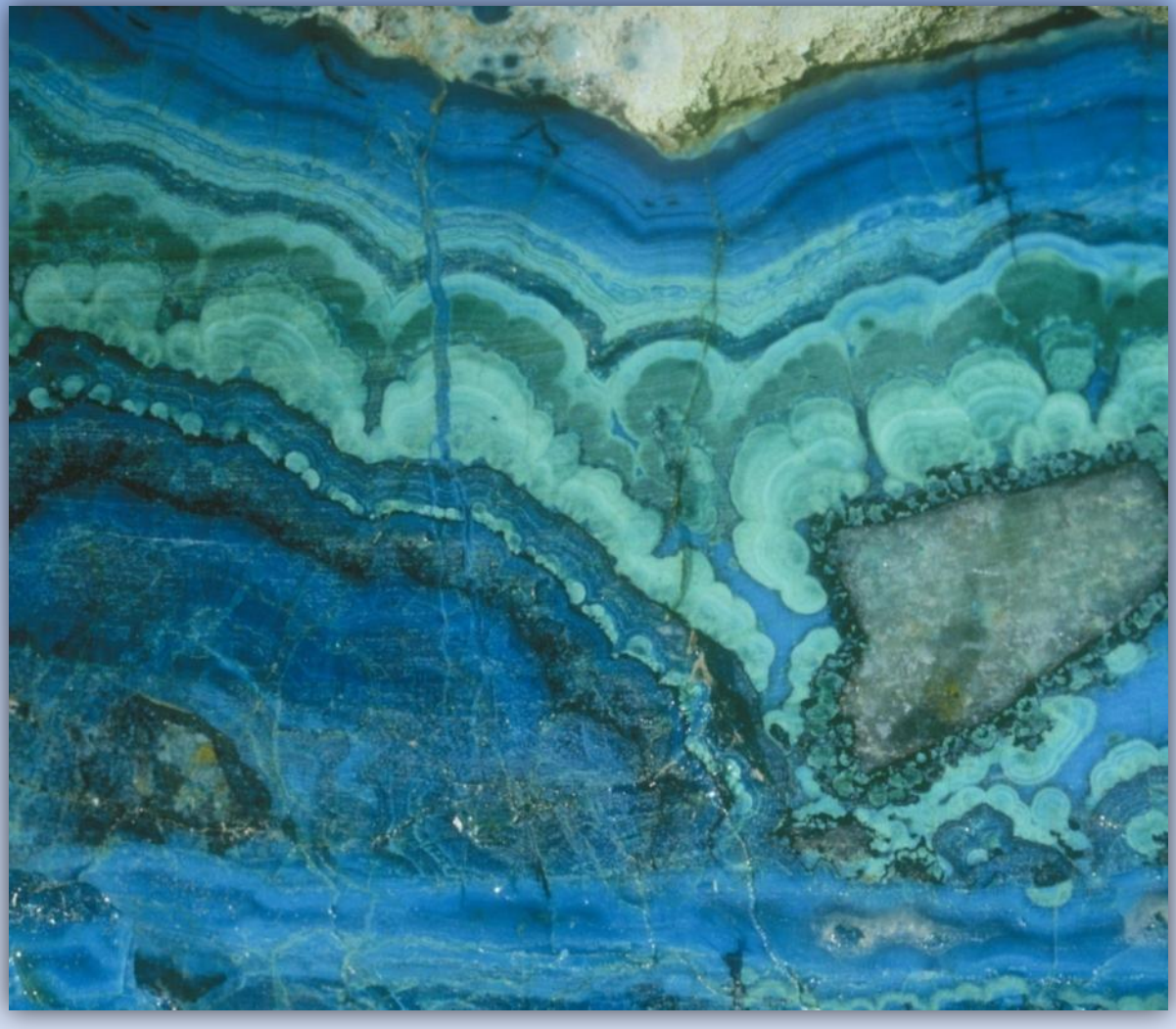
Azurite is a mineral to be expected in the oxidized zone of a copper-bearing sulfide mineral like chalcopyrite. As the chalcopyrite [$CuFeS_2$] breaks down the copper is free to combine with carbonates to produce the Azurite as well as the green malachite. The iron from the chalcopyrite produces the rusty-looking limonite.

Back to the Azurite Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AZURITE



Azurite and malachite often occur together, as in this slice of a mineralized vein. The specimen nicely shows the alternating banding due to changing conditions of oxidation and temperatures, while the copper carbonates were being deposited.

Back to Azurite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AZURITE

This Azurite specimen nicely shows it association with the malachite (green) and the limonite (rusty color). It is from the Morenci Mine in Arizona. The brown limonite is called a gossan (or "iron hat") and is produced by the weathering of a chalcopyrite vein. The chalcopyrite [$CuFeS_{2]}$ is weathered by groundwater. The insoluble iron remained at the surface to produce the limonite gossan, and the copper in solution, percolated down to produce other copper minerals, with higher copper content – thus *enriching* the ore.

Back to Azurite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

Click on picture for a YouTube link of mineral rotation.

These are both barite crystals. The orange one (colored by iron) is part of a single crystal. The white one is a cluster of smaller crystals from the Blue Owl Mine in Arizona.

CHEMISTRY - $BaSO_4$ Barium sulfate
CRYSTALLOGRAPHY - Orthorhombic
CRYSTAL GROWTH AND HABITS - Barite crystals are dipyramidal and often tabular, sometimes with complex intergrowths that can produce barite "roses". Prismatic crystals are also common. Barite can also be granular to earthy.
COLOR AND OTHER OPTICAL PROPERTIES - Colorless, white, light shades of blue and yellow to golden brown
HARDNESS - 3 - 3.5
SPECIFIC GRAVITY - 4.3 - 4.6 Considered heavy for a non-metallic mineral.
LUSTER - Vitreous
STREAK - White
BREAKABILITY - Brittle with perfect basal and good prismatic cleavage
OCCURRENCE - Often found in veins within limestone and as a residual deposit in clay derived from limestone. Barite is also found as a secondary mineral in sulfide veins.
ASSOCIATED MINERALS - Calcite, Dolomite, Quartz

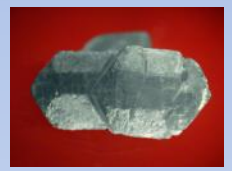
Link to other images of Barite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

Each image can be “clicked” for more information.



Back to Barite Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

This is a light blue Barite crystal from Colorado. The image on the right is the top view, looking down the crystallographic “C” axis of this orthorhombic crystal. This is an example of a bladed growth habit.

Back to Barite Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

This is a single, tabular crystal with a few smaller ones at its base from the Meikle Mine in Nevada. Barite commonly occurs in this yellow translucent type of crystal.

Back to Barite Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

The is a cluster of tabular crystal with a stair-step of growth. Note the variation of color within this specimen – white near the bottom to a gemmy golden yellow near the top.

Back to Barite Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BARITE

These are broken fragments of Barite. They nicely show what it looks like in its more common form, and display its blocky (prismatic) cleavage.

Back to Barite Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BIOTITE

Click on picture for a YouTube link of mineral rotation.

Biotite can be easily identified by its perfect cleavage producing very flat and very smooth surfaces. As the specimen rotates, note the reflections and a bright flash of light from the large cleavage surface.
Biotite is also black to very dark brown, even in thin sheets.

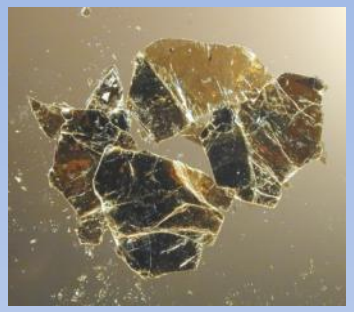
CHEMISTRY - $K(Mg,Fe)_3(Al_3SiO_{10})(OH)_2$ Potassium, magnesium - iron aluminum silicate
CRYSTALLOGRAPHY - Monoclinic
CRYSTAL GROWTH AND HABITS - Prismatic or tabular (short prismatic) crystals. Crystals may appear rhombohedral and are called pseudorhombohedral. Normally biotite occurs as foliated masses or as scaly aggregates.
COLOR AND OTHER OPTICAL PROPERTIES - Dark brownish black, greenish black to black, rarely light yellow. Thin sheets may have a brownish or smoky color.
HARDNESS - 2.5 - 3
SPECIFIC GRAVITY - 2.8 - 3.2
LUSTER - Vitreous or splendent (very high vitreous luster)
STREAK - Brownish
BREAKABILITY - Perfect "micaceous" cleavage
OCCURRENCE - Biotite is a widespread mineral found in igneous rocks, especially granite and syenite. It is also found in large sheets in pegmatites and in felsic lavas as phenocrysts.

Link to other images of Biotite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BIOTITE



Cleavage in Biotite

Biotite in granite

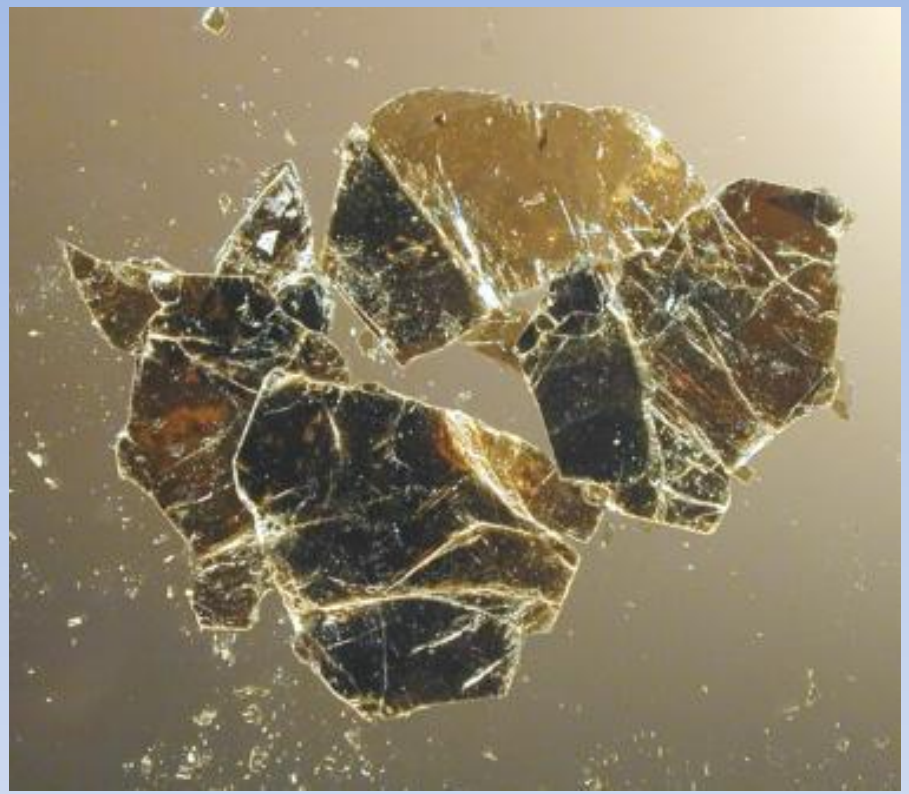
Biotite in garnet

Back to Biotite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BIOTITE



Biotite mica cleaves very easily and produces very flat surfaces. This is considered perfcect cleavage in one direction.

Back to Biotite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BIOTITE

As an important rock forming mineral, Biotite can be found in many rock types including this granite. The black grains are the Biotite, the white grains are feldspar and the grayish grains are quartz.

Back to Biotite

BACK TO THE ALHPABETICAL LIST OF MINERALS

Back to Page 1

BIOTITE

This very red garnet has black inclusions of Biotite. The Biotite has formed crude crystals through a process called exsolution. The crystallization process that produced the garnet could not accommodate the Biotite within its crystal structure and allowed the growth of the Biotite as distinct crystals. This specimen is from a quarry in Gore Mountain, New York. Garnet is used as abrasive material, because of its superior hardness.

Back to Biotite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE

Click on picture for a YouTube link of mineral rotation.

This is an excellent sample of a Calcite cleavage rhombohedron (in front) . The other specimens show some of the variation on color within this mineral species.

CHEMISTRY - $CaCO_3$ Calcium carbonate
CRYSTALLOGRAPHY - Trigonal or Rhombohedral
CRYSTAL GROWTH AND HABITS - Over 300 forms have been described, but there are 3 main habits: prismatic, rhombohedral and scalenohedral. Calcite also occurs as fine to coarse granular aggregates, encrustations and stalactitic growths.
COLOR AND OTHER OPTICAL PROPERTIES - It is clear when pure, but Calcite can take on a tremendous variety of colors by virtue of inclusion of minor impurities. Colors include: red, orange, yellow, green, blue, brown and black. Calcite can be transparent, translucent or opaque. Clear specimens show strong double refraction.
HARDNESS - 3
SPECIFIC GRAVITY - 2.72
LUSTER - Vitreous to earthy
STREAK - White
BREAKABILITY - Calcite has perfect rhombohedral cleavage (3 directions) with angles of 74.9^{o}.
OCCURRENCE - Calcite is one of the most common and widely distributed minerals on the planet. It is found in all rock types as well as vein filling materials and as caliche in soils of arid environments.
OTHER - Reacts (bubbles) readily in cold, dilute hydrochloric acid (HCl).

Link to other images of Calcite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

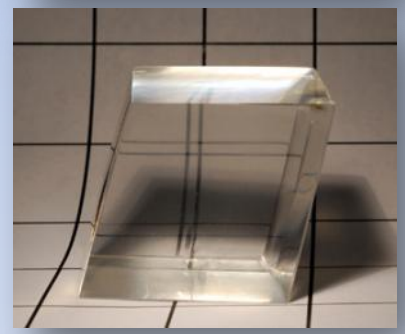
CALCITE

Each image can be “clicked” for more information.

A few of the colors found in Calcite.

“Dogtooth” Calcite crystal

A helectite cave formation.



Double refraction in Calcite.

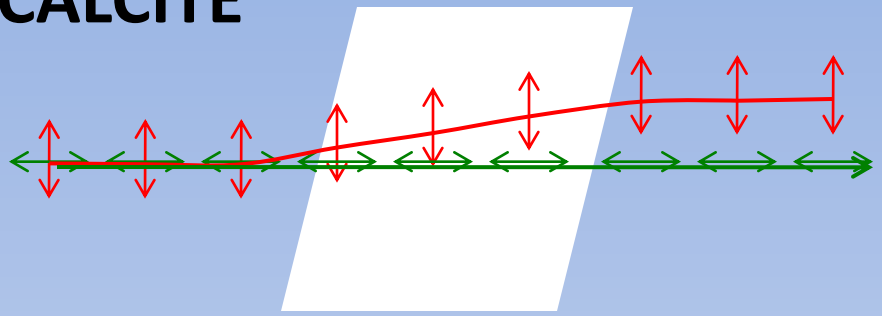
Scalenohedrons of Calcite

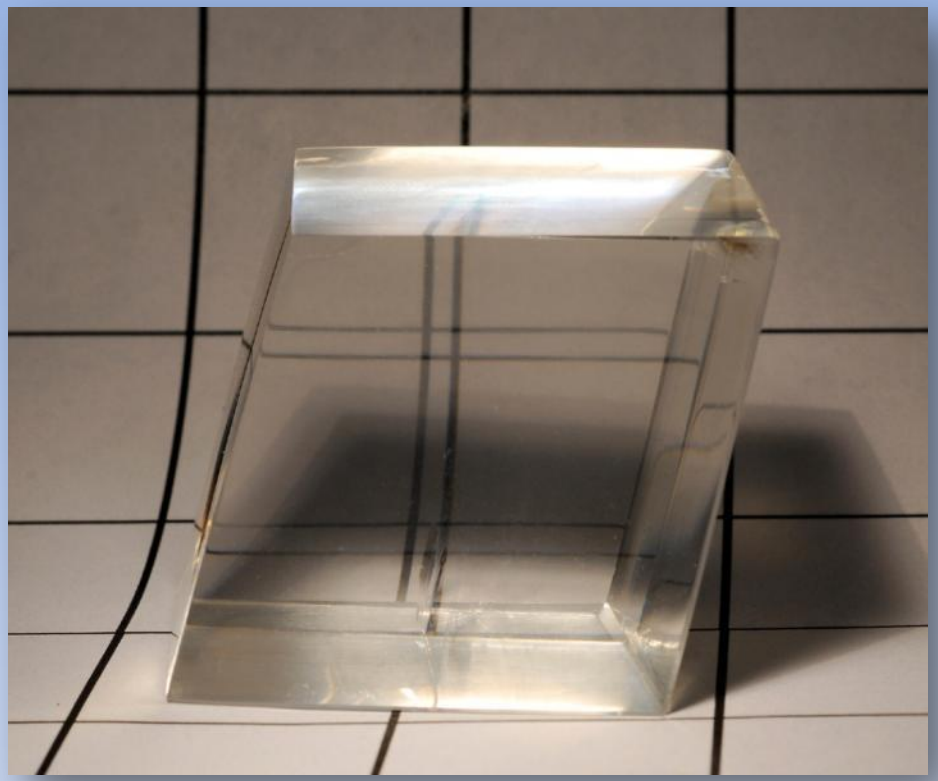
Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE





Light consists of 2 vibrational directions: the **ordinary ray** (horizontal arrows) and the **extraordinary ray** (vertical arrows). As these rays pass through the Calcite's crystal structure it causes the **extraordinary ray** to refract (bend) more than the **ordinary ray**. As a result the rays emerge in different positions, producing a double image of what was behind the Calcite. Note also that each of the emerging rays are polarized (vibrating in the same direction).

Many minerals outside of the Isometric system can produce double refraction. Calcite is a common mineral that displays it excellently in even small pieces. In this image each surface has been polished to remove irregularities to allow the best view of the mineral's characteristic optical property. Also note the very good cleavage that was not altered by the polishing process.

Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE

Calcite crystals can produce a wide variety of forms. These sharp points are of scaleneohedrons and are referred to as “dog tooth” crystals. This cluster, from Mexico, has a coating and some inclusions of hematite to give it the reddish color.

Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE

Calcite is also the common mineral in cave formations. It produces stalactites and stalagmites as well as many other interesting formations. This specimen is a complex, apparently random growth called a helectite. These cave formations form as saturated groundwater enters the atmosphere of the cave and precipitates the calcite crystals to producing the growing structures.

Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE

Calcite comes in a wide variety of colors as this group shows. Obviously color in not a definitive characteristic of the mineral.

Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CALCITE

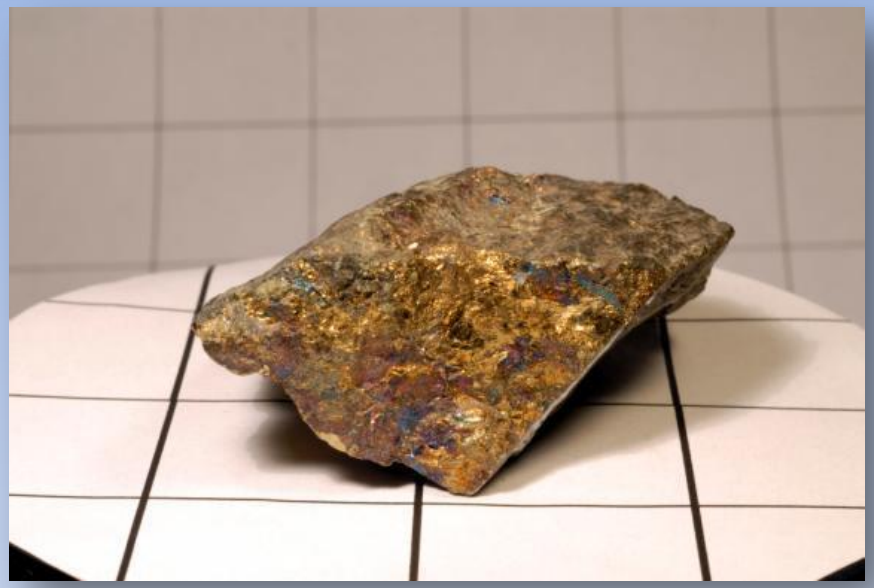
This is a modified scaleneohedron of Calcite, from Tennessee. This shape is called “dogtooth”. Chalcopyrite crystals are found on the left side of the base.

Back to CALCITE

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CHALCOPYRITE



Click on picture for a YouTube link of mineral rotation.

Note in this specimen that a freshly broken surface shows a bright metallic luster. Other surfaces have somewhat tarnished and has darkened producing shades of blue, green and purple. This is typical for Chalcopyrite.

CHEMISTRY - $CuFeS_2$ Copper iron sulfide
CRYSTALLOGRAPHY - Tetragonal
CRYSTAL GROWTH AND HABITS - Tetrahedral crystals are common, often with scalenohedral faces. Chalcopyrite is commonly massive, as well as compact, and occasionally as reniform masses.
COLOR AND OTHER OPTICAL PROPERTIES - Chalcopyrite is normally brass yellow, but often it is tarnished to dark brown. The tarnish can produce a colorful iridescence and as a result it is often called "peacock ore". Chalcopyrite is opaque.
HARDNESS - 3.5 - 4
SPECIFIC GRAVITY - 4.1 - 4.3
LUSTER - Golden metallic
STREAK - Greenish black to black
BREAKABILITY - Uneven with one very poor cleavage direction
OCCURRENCE - A primary sulfide formed in hydrothermal veins
ASSOCIATED MINERALS - Pyrite, Sphalerite, Galena, other copper sulfides

Link to other images of Chalcopyrite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CHALCOPYRITE

Each image can be “clicked” for more information.

A chemically weathered piece of chalcopyrite showing colorful alterations producing what is know as “peacock ore”.

This is the above piece that has been broken to show the fresh surface. Note the more metallic looking surface.

Back to Chalcopyrite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CHALCOPYRITE

Chalcopyrite naturally tarnishes to produce a variety of colors on its surface. This specimen, purchased at a rock shop, was treated with a weak acid to speed the process of the tarnishing to make it market-ready.

Back to Chalcopyrite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

CHALCOPYRITE

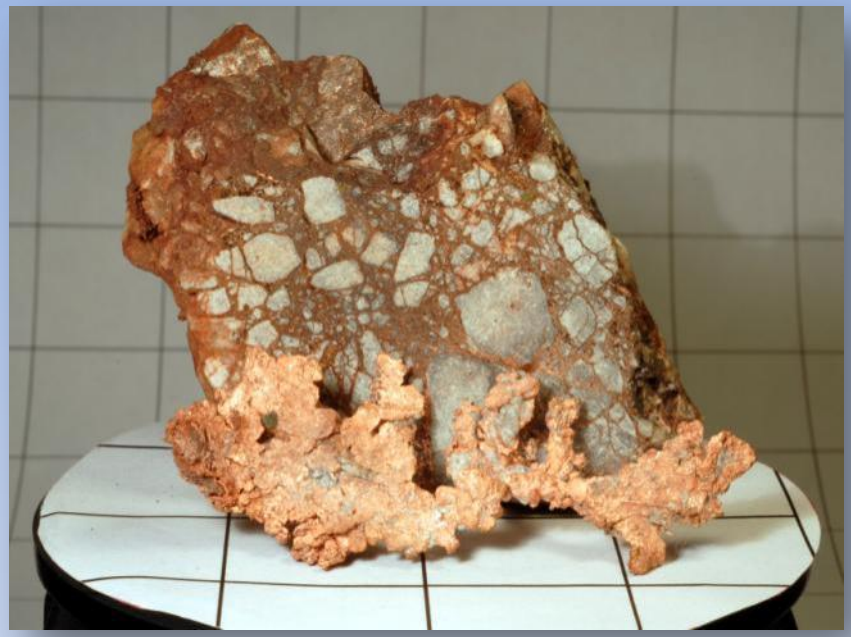
Lusters should always be observed on a fresh surface. This is an excellent example of why that should be done. The freshly broken surface clearly shows the more yellowish, brassy color of chalcopyrite.

Back to Chalcopyrite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

COPPER



Click on picture for a YouTube link of mineral rotation.

These are two Copper specimens from the Ray Mine in Arizona. The one in front shows an arborescent (branching) form produced when the copper grows freely. The rock in the background consists of quartz fragments cemented together by copper.

CHEMISTRY - Cu Copper
CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Copper is found as cubes modified by dodecahedrons and as tetrahedrons. Crystals are often flattened and elongated. Copper also forms twisted wires, arborescent forms and may be massive.
COLOR AND OTHER OPTICAL PROPERTIES - Color is copper-red on a fresh surface, but quickly tarnishes to a dull luster; opaque.
HARDNESS - 2.5 - 3
SPECIFIC GRAVITY - 8.9
LUSTER - Metallic
STREAK - Copper
BREAKABILITY - Hackly fracture, highly malleable (flattens when struck with a hammer), sectile and ductile
OCCURRENCE - Copper is found in the oxidized zone of copper deposits.
ASSOCIATED MINERALS - Cuprite, Azurite, Malachite

Link to other images of Copper

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

COPPER

Each image can be “clicked” for more information.

Back to Copper

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

COPPER

Each image can be “clicked” for more information.

This is two views of the same specimen. It shows the look of Copper as it occurs in nature on the left. The copper is very dull as it has been oxidized. The image on the right shows a surface that was cut with a diamond saw. It reveals a very metallic looking Copper that is actually a cement holding the rocks together. This specimen is from the Ray Mine in southern Arizona.

Back to Copper

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

COPPER

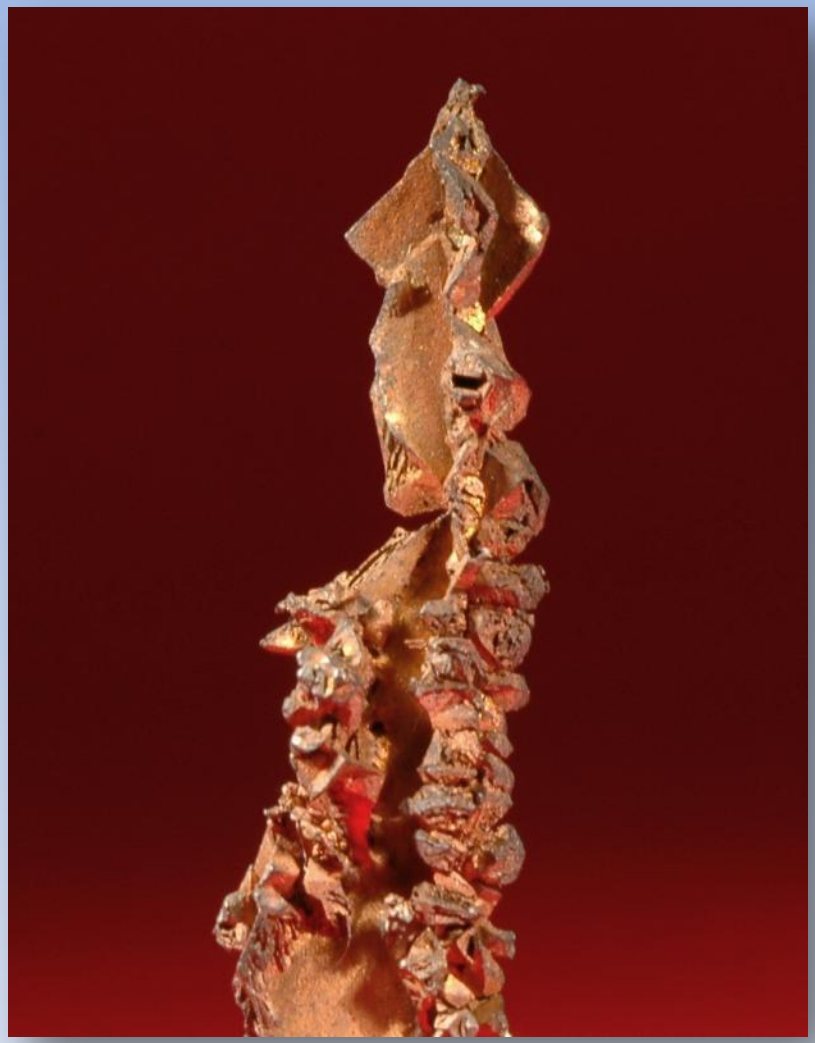
The prominent crystal in the center is a modified octahedron of Copper, with a reddish patina. It is from Michigan.

Back to Copper

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

COPPER



This group of crystals represents the spinel twin law in Copper.

Back to Copper

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

DOLOMITE

Click on picture for a YouTube link of mineral rotation.

These white crystals are Dolomite in a sedimentary rock called dolomite. Note how light reflects off the crystal faces. This type of reflection indicates that the surfaces are curved.

CHEMISTRY - $CaMg(CO_3)_2$ Calcium magnesium carbonate

CRYSTALLOGRAPHY – Trigonal (or Rhombohedral)

CRYSTAL GROWTH AND HABITS - Dolomite crystals are typically rhombohedral and are often curved producing "saddle-shaped" crystals. Dolomite can also occur as granular to compact fine grained masses.

COLOR AND OTHER OPTICAL PROPERTIES - Dolomite is commonly pinkish, but may also be clear, white or gray to black.

HARDNESS - 3.5 - 4

SPECIFIC GRAVITY - 2.85

LUSTER - Dolomite is normally vitreous, but can grade into dull and massive varieties.

STREAK - White

BREAKABILITY - Good rhombohedral cleavage with angles of 73.75°.

OCCURRENCE - Found widely as the sedimentary rock dolomite (dolostone). It is also found well crystallized in pockets in limestone and dolomite.

ASSOCIATED MINERALS - Calcite, Barite, Galena, Sphalerite, Pyrite and Chalcopyrite

OTHER PROPERTIES - When dolomite is powdered it reacts slowly to cold, dilute hydrochloric acid.

Link to other images of Dolomite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

DOLOMITE

Each image can be “clicked” for more information.

Back to Dolomite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

DOLOMITE

This is probably one of the best known crystal forms of Dolomite – saddle-shaped crystals. The curve of the crystals is actually produced by microscopically small offsets in the crystal growth so that to the eye they appear curved.

Back to Dolomite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

DOLOMITE

These are rhomb-shaped crystals of Dolomite.

Back to Dolomite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

Click on picture for a YouTube link of mineral rotation.

Fluorite is another mineral that comes in a wide variety of colors. These are quite subdued. As they rotate watch for the flashes of light from the cleavage faces, especially on the octahedron that starts in the front right position.

CHEMISTRY - CaF_2 Calcium fluoride
CRYSTALLOGRAPHY - Isometric
CRYSTAL GROWTH AND HABITS - Fluorite commonly forms cubes and octahedrons, but can develop a variety of other forms. Fluorite can also be massive, fibrous or botryoidal.
COLOR AND OTHER OPTICAL PROPERTIES - Fluorite has a wide range of colors from clear to nearly black; white, purple, blue, green, yellow, orange, pink and brown. Color changes often produce zoning. Transparent to translucent; commonly fluorescent.
HARDNESS - 4
SPECIFIC GRAVITY - 3.17 - 3.56 (Increasing with impurities)
LUSTER - Vitreous to dull
STREAK - White
BREAKABILITY -Very good cleavage (octahedral) producing very sharp edges; sub conchoidal fracture to uneven fracture; Brittle
OCCURRENCE - Found as an accessory mineral in granite and granitic pegmatites; also in carbonates and in low- to high-temperature hydrothermal veins.
ASSOCIATED MINERALS -Quartz, Dolomite, Calcite, Barite, Pyrite, Galena, Sphalerite, Cassiterite
NAME - From the Latin meaning *to flow,* due to its low melting point.

Link to other images of Fluorite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

Each image can be “clicked” for more information.

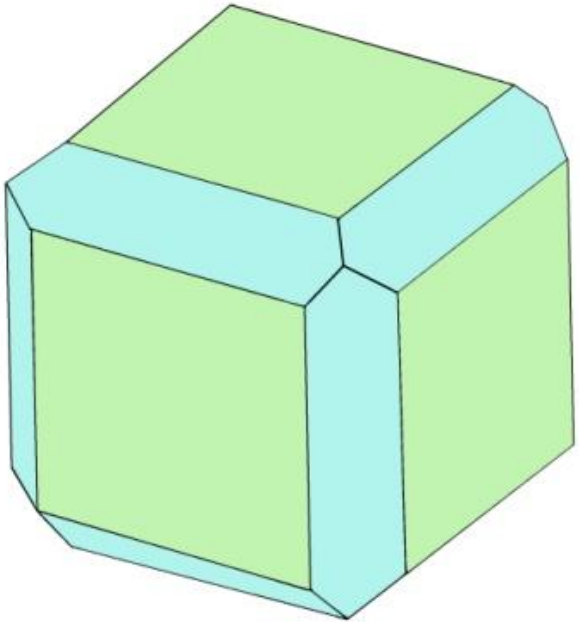
Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

These are clear cubes of Fluorite that have had their edges beveled by the dodecahedral crystal faces.



Click HERE to see the cubic faces on this crystal.

Click HERE to see the dodecahedral faces on this crystal.

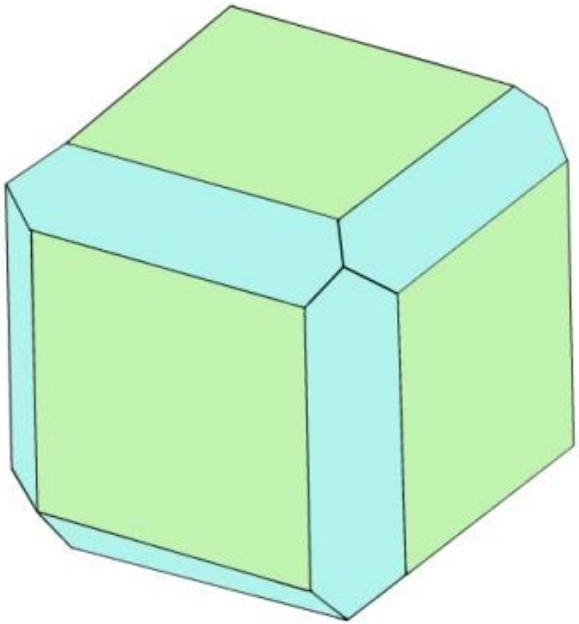
Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

These are clear cubes of Fluorite that have had their edges beveled by the dodecahedral crystal face.



Click HERE to see the dodecahedral faces on this crystal.

Back to the original Fluorite crystal.

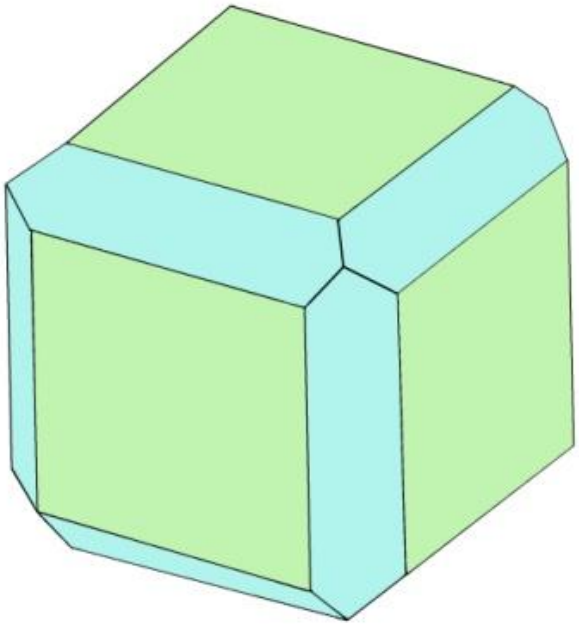
Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

These are clear cubes of Fluorite that have had their edges beveled by the dodecahedral crystal face.



Click HERE to see the cubic faces on this crystal.

Back to the original Fluorite crystal.

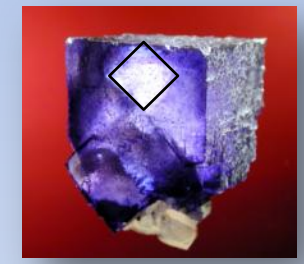
Back to Fluorite

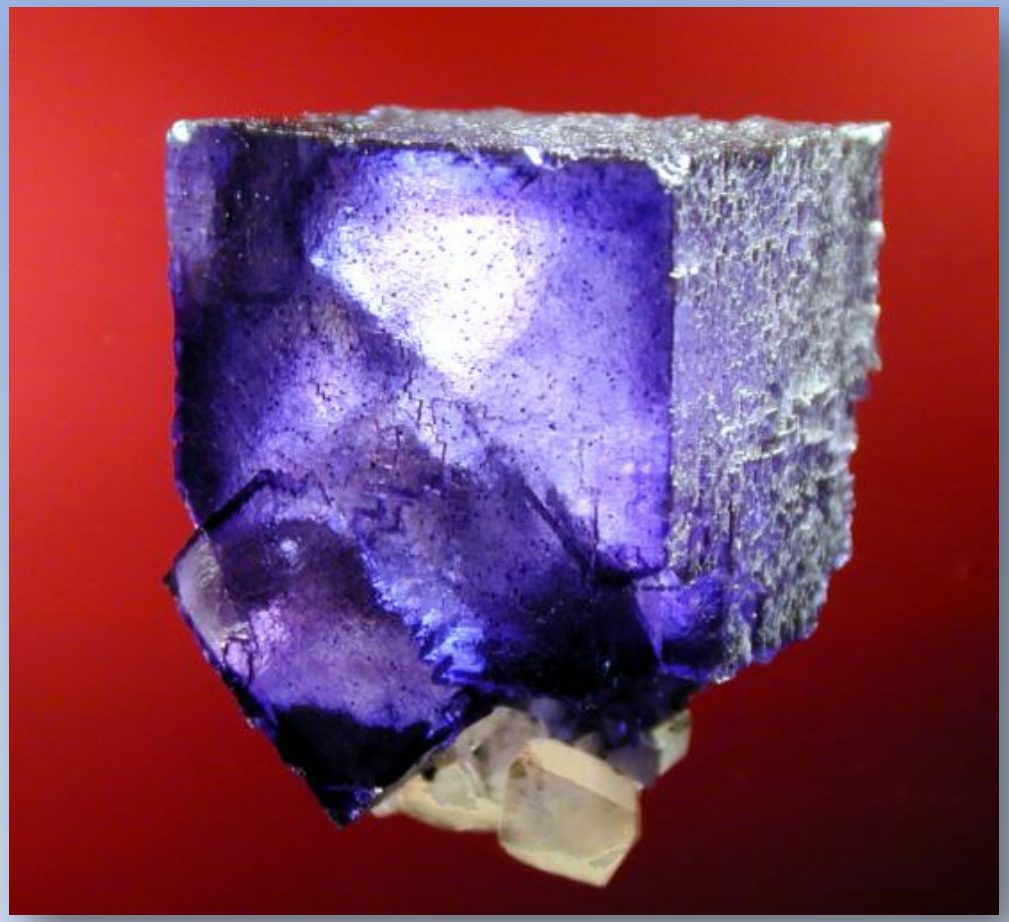
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

This Fluorite is from Illinois and shows a common purple color associated with the mineral. Note also the very irregular growths on the crystal faces (especially the one on the right). These are called growth hillocks and are imperfections that developed as the crystal grew.





The white diamond shape (top center on the image on the right and outlined above) is actually an incipient cleavage plane inside of the crystal. It could cleave in that direction if struck.

Along the base are a few calcite crystals.

Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

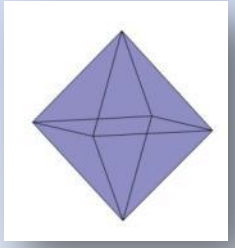
Back to Page 1

FLUORITE

These are cleavage octahedrons of Fluorite. The 4 directions of cleavage can be used to produce this type of fragment… but not by accident.

To produce these very equi-dimensional octahedrons, the position and direction of the cleavage planes must be studied prior to the breaking of the specimen.

Then with practice, octahedrons can be produced. Compare this to the typical ways in which Fluorite breaks in this image below.



Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

Two intergrown cubes of Fluorite perched on top of golden blades of Barite.

Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

This is a cube of Fluorite in which the edges have been beveled by the dodecahedron crystal form. This crystal is from China. The image below is another example of this type of modified cube.

This crystal also exhibits color zoning resulting from “color centers” produced by displaced electrons.

Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

FLUORITE

These are all cleavage fragments of Fluorite and show the common colors and irregularities of cleavage. This is what would actually be produced if you were to break a large piece of Fluorite – not the nice octahedrons shown in the image below.

Back to Fluorite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

Click on picture for a YouTube link of mineral rotation.

Galena is very metallic-looking and has bright reflections from it many cubic cleavage faces as a result. It looks and tarnishes like lead. Note its high specific gravity.

CHEMISTRY - PbS Lead sulfide
CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Galena is most commonly found as cubes, but it also forms cubes that have modifications by the octahedron, dodecahedron or rarely the trisoctahedron. Galena can also be granular to massive.
COLOR AND OTHER OPTICAL PROPERTIES - Bright silvery to dull lead gray
HARDNESS - 2.5
SPECIFIC GRAVITY - 7.4 - 7.6
LUSTER - Bright metallic
STREAK - Lead gray
BREAKABILITY - Perfect cubic cleavage, brittle
OCCURRENCE - Galena is commonly found in metallic sulfide veins.
ASSOCIATED MINERALS - Sphalerite, Pyrite, Marcasite, Chalcopyrite, Cerussite, Anglesite, Dolomite, Quartz, Calcite, Fluorite

Link to other images Galena.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

Each image can be “clilcked” for more information.

Cleavage Fragments

Galena with Chalcopyrite

An octahedron of Galena

The cube and octahedron crystal shape

Modified cubes of Galena

Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

Galena has very good cubic cleavage. This specimen was struck with a hammer and broke into all of these pieces. Even the smallest fragments display the cleavage in which the three faces meet at 90^{o} angles.

Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

This is a highly modified cube of Galena in which the edges of the crystal seem to have grown faster than the centers. The result is this “skeletal” type of growth. If that type of growth were to continue, a hopper crystal would have resulted.

Associated with this crystal is chalcopyrite on the left (brassy yellow) and quartz crystals along the base.

Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

This Galena crystal is dominated by the octahedral form as seen by the triangular faces. The octahedron has had its points truncated by the cube form.

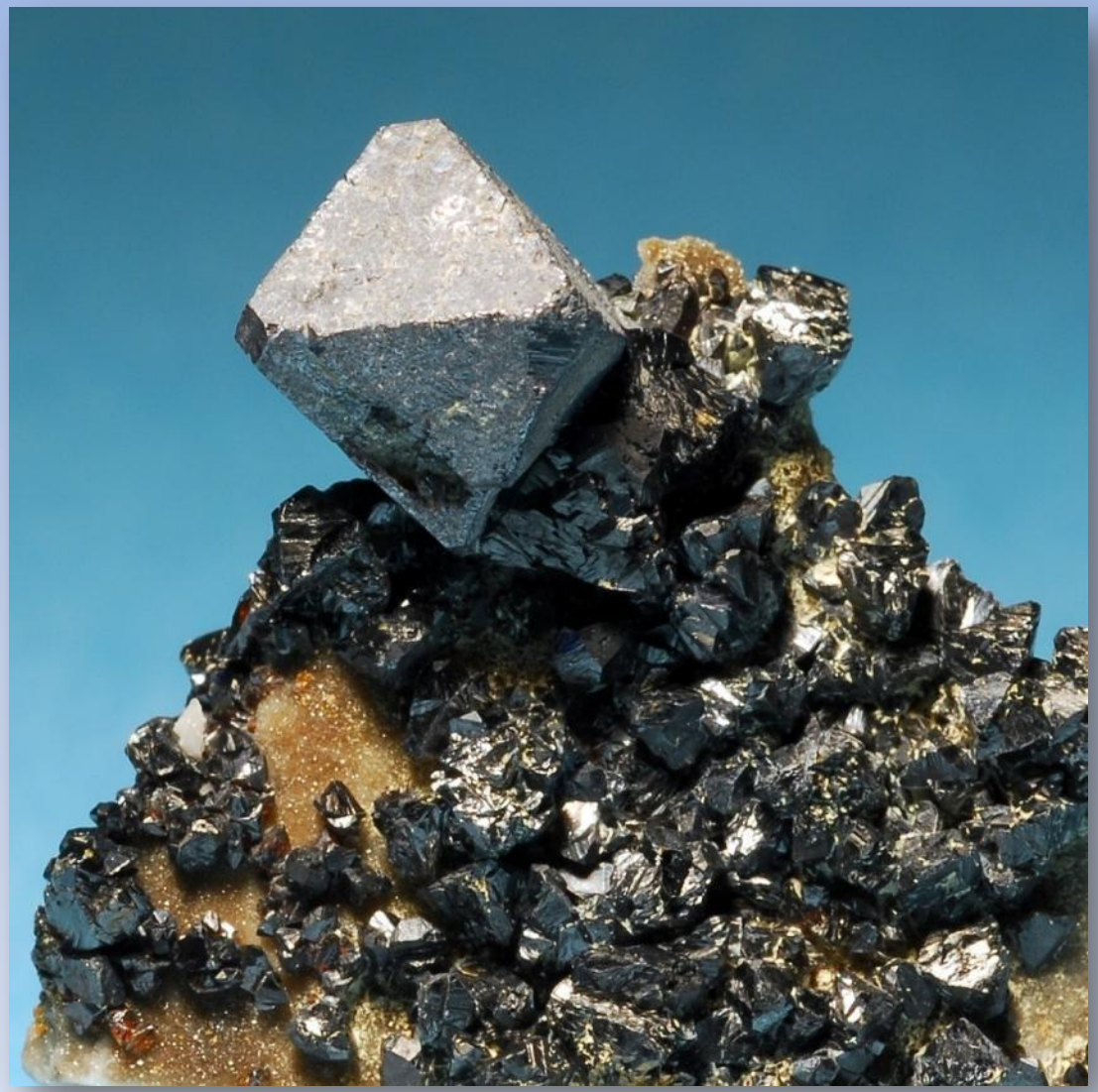
Associated with the Galena are small red and yellowish crystals of sphalerite which is often found with Galena.

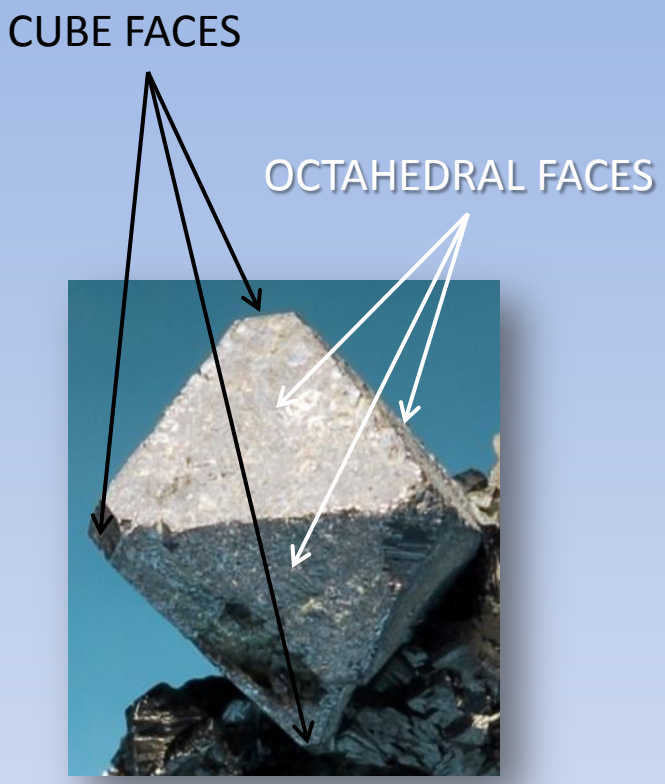
Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA





This is an octahedron of Galena with the tips truncated by the cubic form. The black crystals below are sphalerite.

Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GALENA

In this specimen of Galena the cubic and octahedral faces are about equal in size on the crystals. Note the triangular shape of the octahedral faces and the square shape of the cubes.

Associated with the Galena are orange crystals of sphalerite and brassy yellow crystals of chalcopyrite.

Back Galena

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GARNET

Click on picture for a YouTube link of mineral rotation.

Two Garnets, Almandine (red) and Grossular (gray). Note in the video clip that the large grossular garnet has an obvious flash of light from a diamond shaped dodecahedral face. The smaller almandine garnet have some dodecahedral faces as well as trapezohedral faces.

GARNET is a group name, here are some common species:
CHEMISTRY - Members of the group can be expressed using this formula:

$$A_3B_2Si_3O_{12}$$

Pyrope $Mg_3Al_2Si_3O_{12}$
Almandine $Fe_3Al_2Si_3O_{12}$
Spessartine $Mn_3Al_2Si_3O_{12}$
Uvarovite $Ca_3Cr_2Si_3O_{12}$
Grossular $Ca_3Al_2Si_3O_{12}$
Andradite $Ca_3Fe_2Si_3O_{12}$

CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Garnets typically form dodecahedrons and trapezohedrons and combinations of these forms. They can also be found as granular to massive.
COLOR AND OTHER OPTICAL PROPERTIES - Garnets are commonly red but also brown, yellow, white, green or black. They are typically transparent to translucent.
HARDNESS - 6.5 - 7.5
SPECIFIC GRAVITY - 3.5 - 4.3
LUSTER - Vitreous to resinous
STREAK - White
BREAKABILITY - The fracture of garnets is conchoidal to uneven and parting is occasionally observed. They are brittle.
OCCURRENCE - One of the most common minerals. Garnets are found as accessories in igneous rocks, commonly found in schists and gneisses, and also as a resistant constituent (sand grain) in sandstones.

Link to other images of Garnet.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

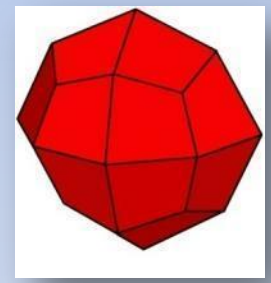
GARNET

Each image can be “clilcked” for more information.

Spessartine Garnet on orthoclase

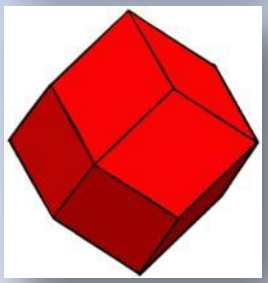
Pyrope in Schist

Uvarovite Garnet



This is the trapezohedral form often found in Garnet.

Spessartine Garnet in rhyolite



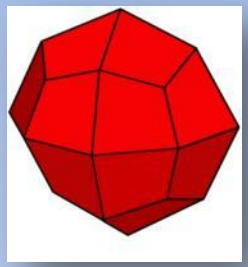
This is the dodecahedral form also commonly found in Garnet.

Back to Garnet

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GARNET



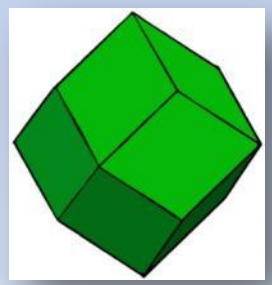
This is a gemmy, translucent, trapezohedral crystal of Spessartine Garnet from China. It is associated with feldspar (light tan), quartz (grey) and a few blocky crystals of arsenopyrite (silver).

Back to Garnet

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GARNET



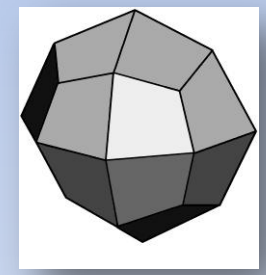
Uvarovite is a rare type of Garnet that contains chromium. The crystals are very commonly dodecahedral. Note the diamond shape flash of light off one of the crystal faces on the top left of the specimen.

Back to Garnet

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GARNET



These crystals show basically the trapezohedral faces of garnets. They appear black but are actually a very deep, deep red in color. They formed by pneumatolitic (gasses) processes in pockets within the volcanic rock rhyolite. They are from Mojave County in Arizona.

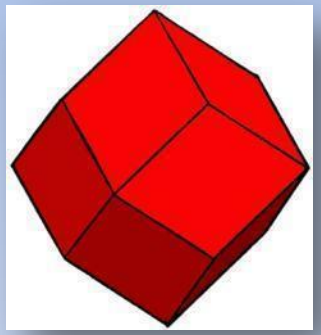
They are classified as Spessartine/Almandine as the two subspecies can form a continuous solid solution.

Back to Garnet

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GARNET



This is a dodecahedral Garnet with the diamond shaped faces very nearly equal in size. Garnets often form in metamorphic rocks and are common in schists.

Back to Garnet

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GOLD

Click on picture for a YouTube link of mineral rotation.

This is a 23 gram Gold nugget is from Australia. It is very angular which is an indication that it has not travelled very far. Gold is soft and would easily be flattened and rounded by transport.

CHEMISTRY - Au Gold
CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Native gold occurs as octahedrons, dodecahedrons and cubes. It also forms wires, dendritic and spongy masses, and as rounded nuggets and flakes.
COLOR AND OTHER OPTICAL PROPERTIES - Gold is golden yellow when pure, but silver lightens its color and copper tends to make it redder. It is opaque.
HARDNESS - 2.5 - 3
SPECIFIC GRAVITY - 19.3
LUSTER - Bright metallic gold
STREAK - Gold
BREAKABILITY - Hackly fracture, very malleable, ductile and sectile
OCCURRENCE - Gold is typically found in quartz veins, or with pyrite and other sulfides. It is often concentrated in streams as placer deposits.
ASSOCIATED MINERALS - Pyrite, Chalcopyrite, Quartz, Arsenopyrite, Silver

Link to other images of Gold.

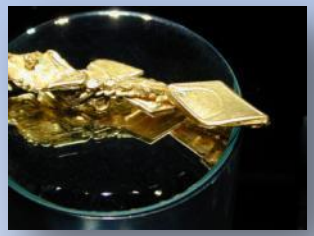
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

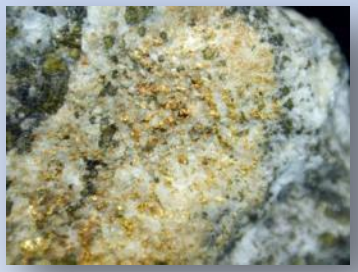
GOLD

Each image can be “clilcked” for more information.

Arizona Gold Nuggets



Crystallized Gold



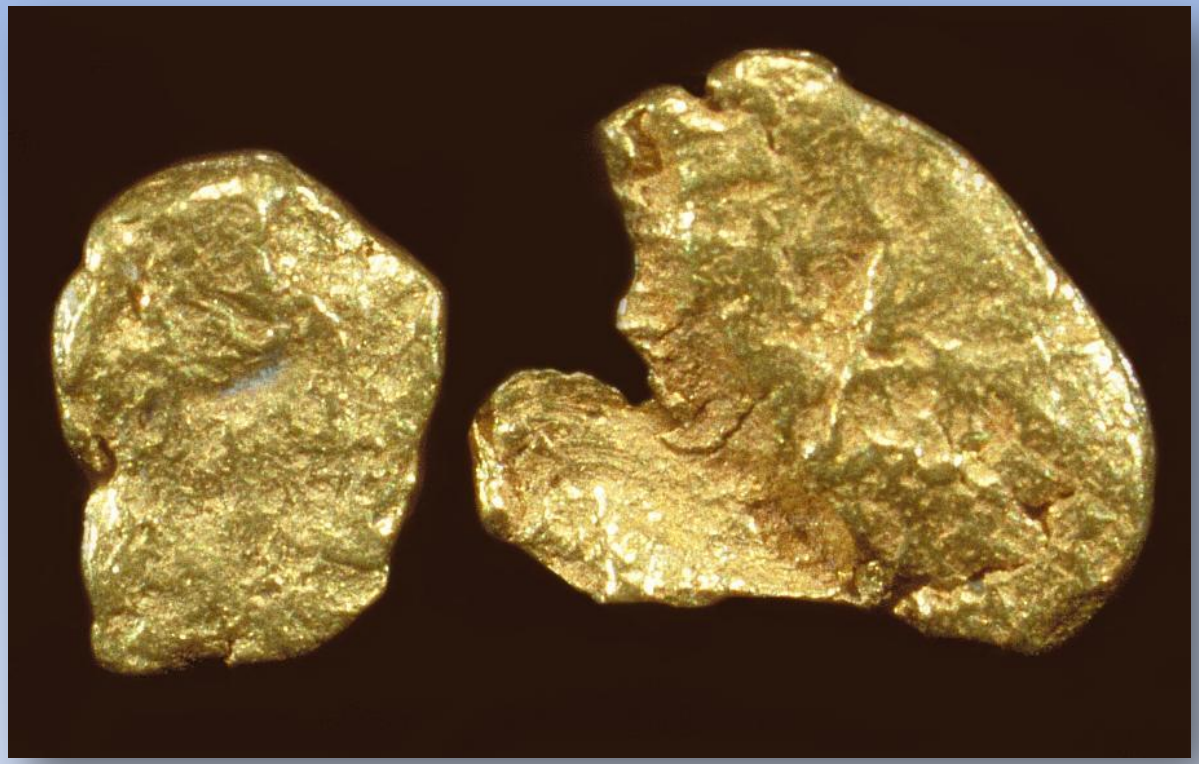
Gold in Quartz

Back to Gold

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GOLD



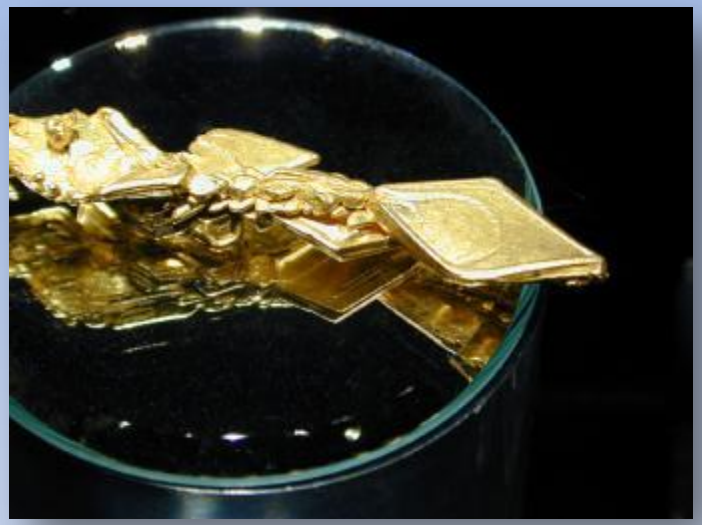
Gold is a joy to find, and here in Arizona there are several places where you can pan for Gold. This Gold is from Lynx Creek and was found by panning. The high density of Gold allows it to settle to the bottom of the pan along with hematite, magnetite, garnets and other minerals that make up the “black sand” at the end of the panning process. Note that this Gold is flattened and somewhat rounded. As it traveled along the creek it got “hammered” by rocks, but instead of breaking it bent and flattened.

Back to Gold

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GOLD



Crystalline Gold is very rare and although Gold is already expensive, nice crystals are MUCH more so. Gold crystallizes in the isometric system, but irregularities in the environment of growth dictate the final form.

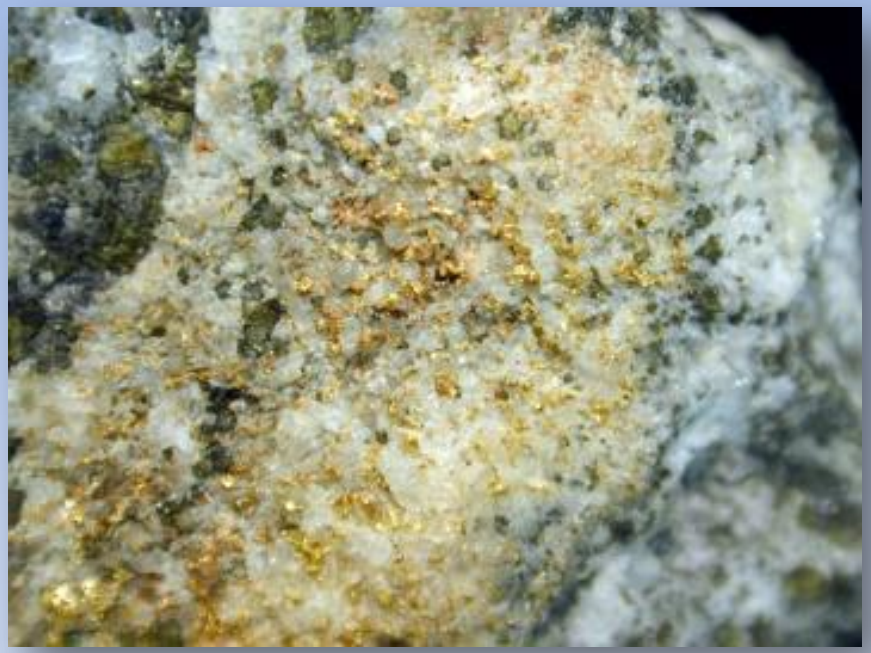
These fine specimens were produced by hydrothermal solutions and are from Colorado.

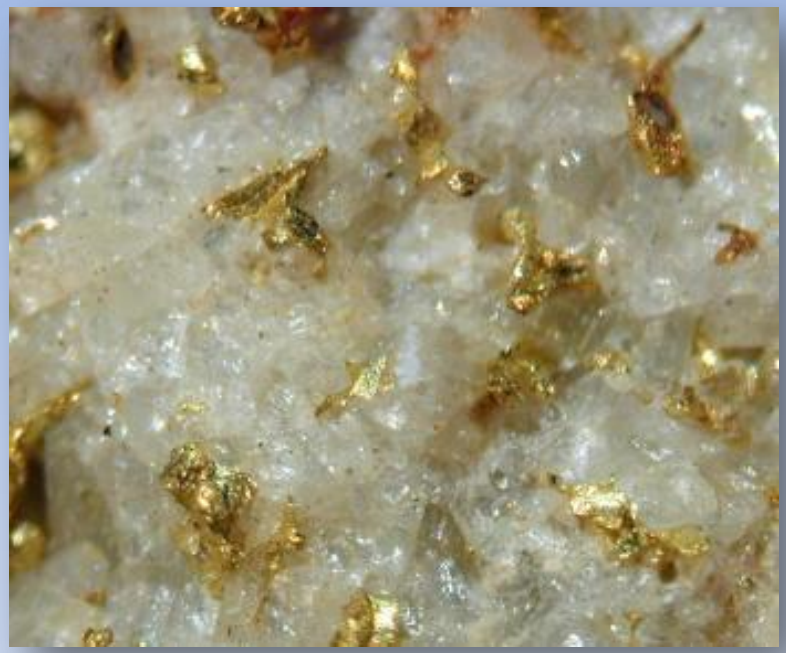
Back to Gold

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GOLD





The expression is “Gold is where you find it.” And that is pretty much true, as it is found in many different types of rocks and environments. One common association is with quartz, as is pictured here. (Close up view on the right.)

Back to Gold

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GRAPHITE

Click on picture for a YouTube link of mineral rotation.

Graphite looks oily or greasy and is not quite metallic looking. This gray color is typical for the mineral.

CHEMISTRY - C Carbon
CRYSTALLOGRAPHY - Hexagonal
CRYSTAL GROWTH AND HABITS - Graphite is common as hexagonal or scaly plates and is also massive.
COLOR AND OTHER OPTICAL PROPERTIES - Iron black to steel gray
HARDNESS - 1 - 2
SPECIFIC GRAVITY - 2.1 - 2.2
LUSTER - Submetallic to metallic or oily
STREAK - Black to steel gray
BREAKABILITY - Perfect basal cleavage. In the process of touching graphite, cleavage planes are separated allowing the graphite to "soil" your hands. It is this ease of cleavage that allows graphite to be used as a non-volatile lubricant and as a writing tool.
OCCURRENCE - Graphite is formed by the metamorphism of carbonaceous sedimentary rocks like coal.

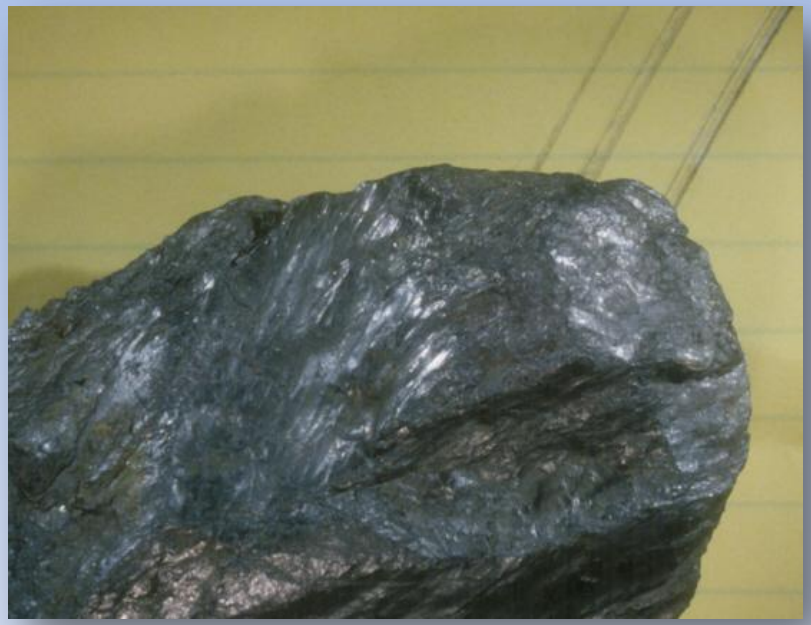
Link to other images of Graphite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GRAPHITE

These images are not linked to any other images.



Graphite easily marks paper and is used in pencil “lead” which is a combination of Graphite and clay.

This specimen nicely shows the typical foliated appearance of the sub-metallic mineral.

Back to Graphite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

Click on picture for a YouTube link of mineral rotation.

This is a variety of Gypsum called selenite. It looks somewhat like muscovite mica, but it has 3 directions of cleavage. It does split into thin sheets like mica, but not as easily; and the sheets are flexible. At the base of the selenite is a piece of gypsum of the satin spar variety.

CHEMISTRY - $CaSO_4 \cdot H_2O$ Hydrous calcium sulfate
CRYSTALLOGRAPHY - Monoclinic
CRYSTAL GROWTH AND HABITS - Gypsum crystals are prismatic to tabular, and commonly form "fish tail" twins.
COLOR AND OTHER OPTICAL PROPERTIES - Clear to white or brownish
HARDNESS - 2
SPECIFIC GRAVITY - 2.32
LUSTER - Vitreous to earthy
STREAK - White
BREAKABILITY - Gypsum has 3 directions of cleavage, one is nearly perfect, like mica, and produces thin sheets. The thin sheets are flexible, not elastic as with mica. Gypsum is also sectile.
OCCURRENCE - Gypsum is very common as sedimentary rock, produced by the evaporation of water (evaporite). It is also found in association with fumerolic gases.
ASSOCIATED MINERALS - Anhydrite, Calcite, Dolomite

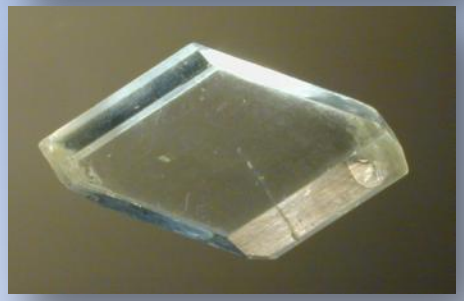
Link to other images of Gypsum.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

Each image can be “clilcked” for more information.



Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

Clear Gypsum is called selenite. This specimen was collected in a limestone quarry just outside Niagara Falls, New York. It shows a cleaved crystal (the part facing the camera has been cleaved. Associated with the Gypsum are many small rhomb-shaped crystals of white dolomite.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

This is a single clear crystal of Gypsum from Canada.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

Thousands of tiny acicular (hair-like) crystals make up this mass of Gypsum giving it a silky look. This type of Gypsum is called satin spar.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

These are Gypsum “roses” in allusion to the intergrowth of the tabular crystals giving the cluster a flowery look. These crystals are from Oklahoma.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

This curved crystal group is called “ram’s horn” for obvious reasons. It is a common form in cave deposits.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

GYPSUM

These are bladed growths of Gypsum. The two big crystals on top nicely show what is called “fish tail” twins.

Back to the Gypsum Main Page

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

HALITE

Click on picture for a YouTube link of mineral rotation.

This is a fairly large cleavage fragment of Halite that shows its very good cubic nature… just like a grain of salt from a salt shaker -- only bigger!

CHEMISTRY - NaCl Sodium chloride
CRYSTALLOGRAPHY - Isometric, cubic
CRYSTAL GROWTH AND HABITS - Crystals of Halite are most commonly cubes, rarely modified by octahedral faces. It may also produce hopper crystals; parallel overgrowths; and can be encrusting, massive and stalactitic.
COLOR AND OTHER OPTICAL PROPERTIES - Colorless to white, blue and a variety of other colors depending on impurities. The pink color Halite from Searles Lake, is due to the inclusion of bacteria that live in the brine pools.
HARDNESS - 2
SPECIFIC GRAVITY - 2.16 - 2.17
LUSTER - Vitreous
STREAK - White
BREAKABILITY - Halite has a very good cubic cleavage and is brittle.
OCCURRENCE - Halite occurs principally from the evaporation of saline bodies of water.
ASSOCIATED MINERALS - Gypsum, Anhydrite, Polyhalite, Sulfohalite, Glauberite, Sylvite, Trona, Hanksite, Thenardite, Mirabilite
NAME - From the Greek word "*hals*", for sea.

Link to other images of Halite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

HALITE

Halite is formed as bodies of water evaporate. These well formed cubes grew in Searles Lake near Trona, California.

This poor soul is collecting salt crystals from one of the brine pools on Searles Lake. The pink color is due to bacteria that lives in the hyper saline brine.

Back to Halite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

HEMATITE

Click on picture for a YouTube link of mineral rotation.

Yes, they are both Hematite. The front one shows the metallic ***specular*** variety and the back one the earthy type called ***oolitic*** hematite.

CHEMISTRY - Fe_2O_3 Iron oxide
CRYSTALLOGRAPHY - Hexagonal
CRYSTAL GROWTH AND HABITS - Crystals of Hematite are often complex rhombohedrons or prisms. Hematite is also common as thin tabular to micaceous crystals and as radiating fibrous, stalactitic, massive earthy, granular and oolitic varieties.
COLOR AND OTHER OPTICAL PROPERTIES - Hematite is steel gray to dull gray and reddish. It is opaque.
HARDNESS - 5.5 - 6.5
SPECIFIC GRAVITY - 5.26
LUSTER - Metallic to dull and earthy
STREAK - Reddish brown
BREAKABILITY - Uneven to subconchoidal fracture, brittle
OCCURRENCE - Hematite is found as an accessory mineral in felsic igneous rocks and as crystals in high temperature hydrothermal veins. It is also found as a cement in sedimentary rocks or in massive oolitic deposits.
ASSOCIATED MINERALS - Ilmenite, Rutile, Magnetite, Goethite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

LIMONITE

Click on picture for a YouTube link of mineral rotation.

This is typical Limonite with a dull or earthy luster and brown color. It is pretty much a lump of rust, derived from the weathering of iron-bearing minerals like pyrite or chalcopyrite.

CHEMISTRY - $FeO(OH) \cdot nH_2O$ Hydrous iron oxides
CRYSTAL GROWTH AND HABITS - Limonite is found in mammilary to stalactitic masses and is also found as concretions, nodules and earthy masses.
COLOR AND OTHER OPTICAL PROPERTIES - Various shades of brown
HARDNESS - 5 - 5.5
SPECIFIC GRAVITY - 3.6 - 4
LUSTER - Dull and earthy
STREAK -Yellowish brown to brown
BREAKABILITY - Uneven and earthy fracture
OCCURRENCE - Limonite is formed by the weathering of minerals bearing iron, especially various iron sulfides.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MAGNETITE

Click on picture for a YouTube link of mineral rotation.

This is a cluster of octahedral crystals of Magnetite that are partially replaced by specular hematite, as indicated by the shiny flakes.

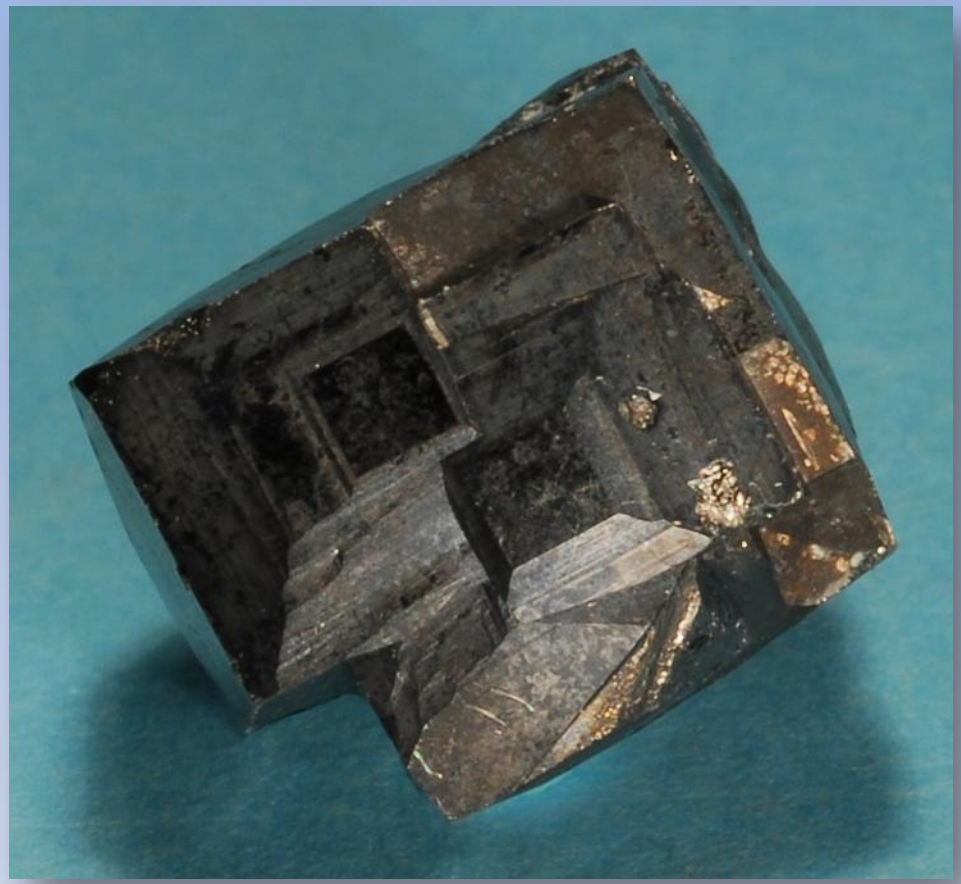
CHEMISTRY - Fe_3O_4 Iron oxide
CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Magnetite crystals are commonly octahedral and occasionally dodecahedral and rarely cubic. It can also be granular to massive.
COLOR AND OTHER OPTICAL PROPERTIES - Magnetite is black to gray with a slight brownish hue.
HARDNESS - 5.5-6.5
SPECIFIC GRAVITY - 5.2
LUSTER - Metallic to sub-metallic and dull
STREAK - Black
BREAKABILITY - Uneven fracture, brittle
OCCURRENCE - A common accessory mineral in igneous and metamorphic rocks. It is also found in sedimentary layers as banded iron ore formations.
ASSOCIATED MINERALS - Chromite, Ilmenite, Rutile, Pyrite, Hematite
OTHER PROPERTIES - Strongly magnetic

Link to other images of Magnetite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MAGNETITE



This is a cubic crystal of Magnetite that shows extensive growth hillocks. Cubic crystals like this one are not common. It comes from the Balmat area of New York.

Link to other images of Magnetite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MALACHITE

Click on picture for a YouTube link of mineral rotation.

Malachite is another mineral that has a distinctive color -- green. This specimen is associated with blue azurite and brown limonite.

CHEMISTRY - $Cu_2(CO_3)(OH)_2$ Copper carbonate hydroxide
CRYSTALLOGRAPHY - Monoclinic
CRYSTAL GROWTH AND HABITS - Malachite typically forms fibrous to silky crusts and is also massive. It is common as a psuedomorph after azurite.
COLOR AND OTHER OPTICAL PROPERTIES - Green, translucent to opaque
HARDNESS - 3.5 - 4
SPECIFIC GRAVITY - 3.9 - 4.0
LUSTER - Vitreous to dull
STREAK - Green
BREAKABILITY - Splintery fracture with basal cleavage, brittle
OTHER – Malachite will react slowly in dilute hydrochloric acid.
OCCURRENCE - A secondary mineral formed by the weathering of copper deposits
ASSOCIATED MINERALS - Azurite, Cuprite, Brochantite, Chrysocolla, Tenorite , Limonite

Link to other images of MALACHITE

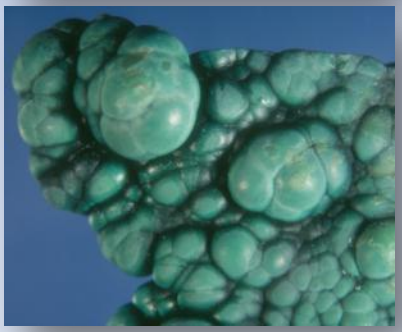
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

A spherical growth of crystals.

Malachite pseudomorphs after Azurite

Fibrous Malachite



Botryoidal or reniform Malachite

Back to Malachite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

Fibrous crystals of Malachite are seen in this broken specimen. The clusters produce the *botryoidal* or *reniform* mass commonly seen in this mineral species. In this specimen the Malachite has been covered with quartz.

Back to Malachite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

This is Malachite, but it was formerly the mineral azurite. This is an example of a ***pseudomorph*** (pseudo – false, morph – form). After the azurite crystals had formed, the physical and chemical environment changed. The azurite was unstable and, by a change in its chemistry, it became Malachite – a mineral that was stable under the new conditions. This specimen would correctly be called: Malachite pseudomorph after Azurite.

Back to Malachite

BACK TO THE ALPHABETICAL LIST OF MINERALS

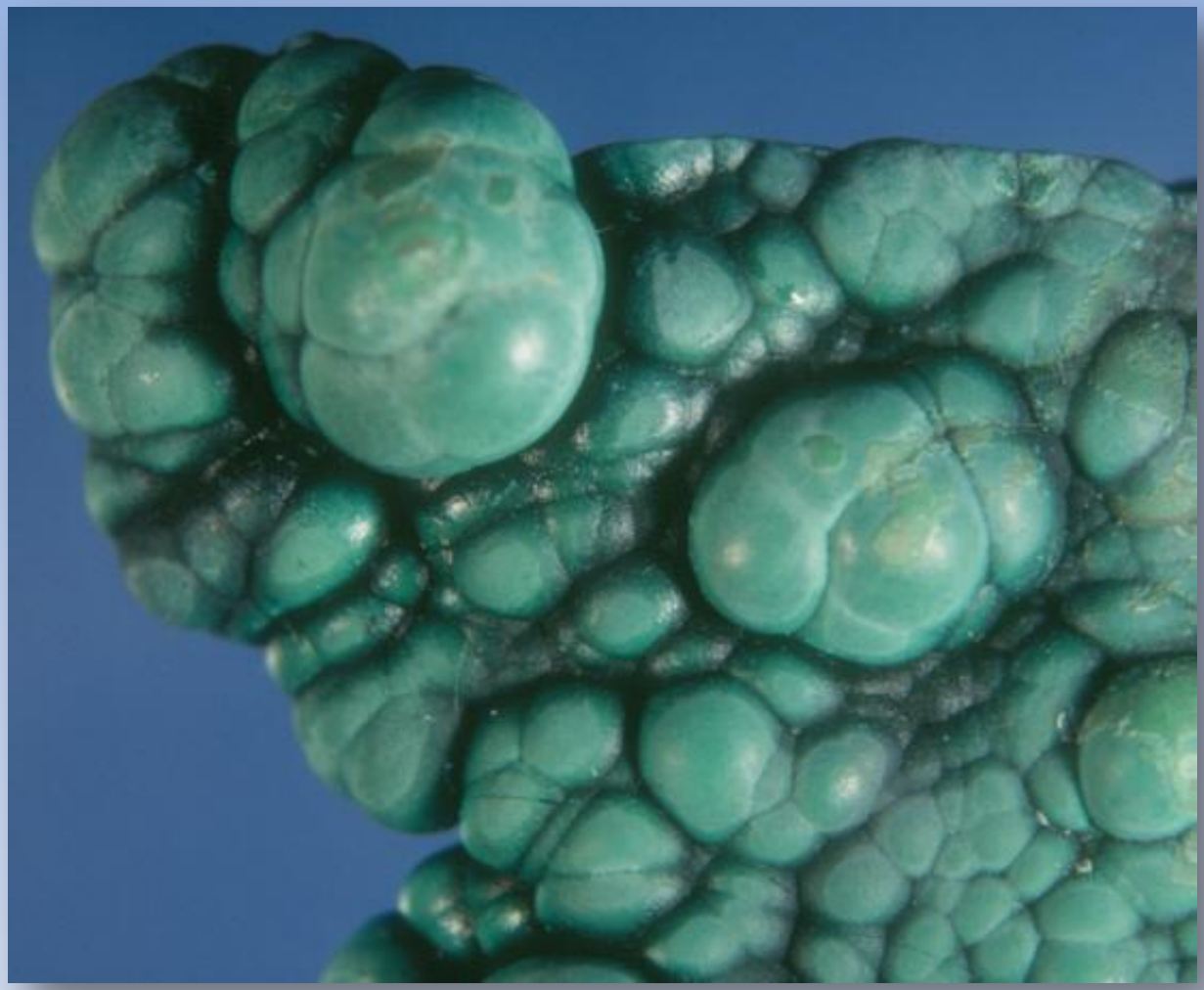
Back to Page 1

Radiating fibrous growth is seen in this fine specimen of Malachite from Zaire, Africa.

Back to Malachite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1



This is a cluster of acicular crystals that outwardly has the appearance of a bubble-like mass. Its crystal growth habit is botryoidal or reniform. If the mass were broken, it may look like the small image to the right.

Back to Malachite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MUSCOVITE

Click on picture for a YouTube link of mineral rotation.

Muscovite is another mica, like biotite. But it is much lighter in color. As the specimen rotates, note its thinness and how light reflects from the large cleavage surfaces.

CHEMISTRY - $KAl_2(Si_3Al)O_{10}(OH,F)_2$ Potassium aluminum silicate hydroxide fluoride

CRYSTALLOGRAPHY - Monoclinic

CRYSTAL GROWTH AND HABITS - Muscovite is tabular to columnar. It is commonly pseudo-hexagonal or diamond-shaped. It also forms aggregates that are plumose, scaly, globular or massive.

COLOR AND OTHER OPTICAL PROPERTIES - Colorless, gray, brownish, green, yellow and rose; transparent to translucent

HARDNESS -2.5 across cleavage sheets and 4 along the sides of the crystals (perpendicular to cleavage direction)

SPECIFIC GRAVITY - 2.7 - 2.8

LUSTER - Vitreous to pearly

STREAK - White

BREAKABILITY - Perfect cleavage in 1 direction producing very thin elastic sheets; uneven fracture

OCCURRENCE - A common rock-forming mineral in granite, gneiss, schist and granite pegmatites.

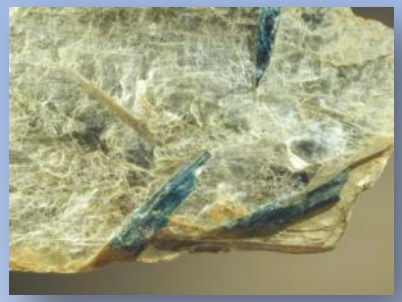
ASSOCIATED MINERALS - Quartz, Plagioclase feldspars, Potassium feldspars, Biotite, Tourmaline, Beryl, Garnet

Link to other Muscovite pictures

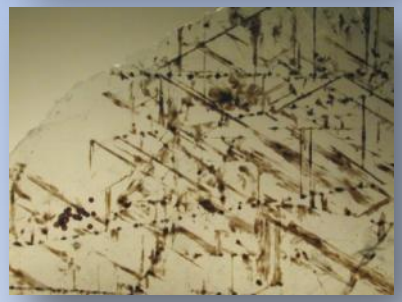
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MUSCOVITE



Muscovite with beryl crystals as inclusions



Muscovite with aligned inclusions

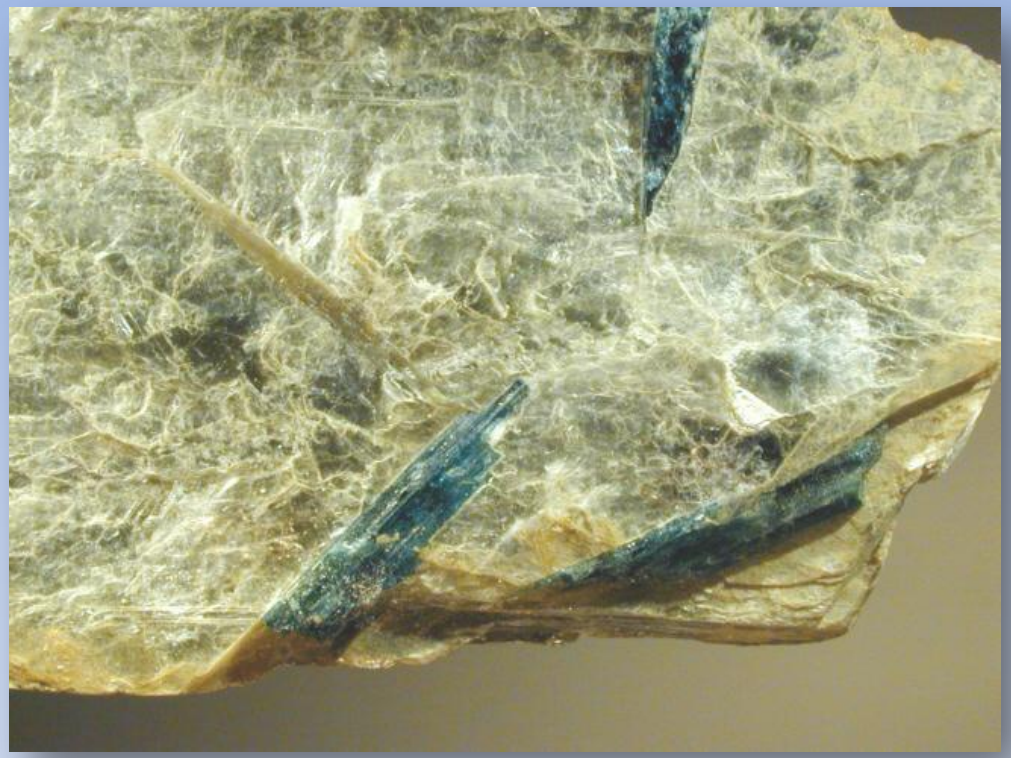
Muscovite cluster attached to a beryl crystal

Back to Muscovite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MUSCOVITE



Muscovite is a pegmatite mineral, and often one of the last to crystallize. In this specimen, note the layers of cleavage in the lower right and the included Beryl crystals. This specimen is from South Dakota.

Back to Muscovite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MUSCOVITE

This is a very thin cleavage sheet of mica, about 0.1mm thick. Obviously, Muscovite cleaves very easily and perfectly to produce these thin layers. Inside of the Muscovite are aligned inclusions of hematite. They are aligned along the crystallographic structure of the Muscovite, and must have grown either at the same time the mica was growing or slightly after.

Back to Muscovite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

MUSCOVITE

This attractive specimen is a crystal of beryl (variety aquamarine) that grew in a pegmatite in Pakistan. Attached to the side of it is a rosette cluster of Muscovite.

Back to Muscovite

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

OLIVINE

Click on picture for a YouTube link of mineral rotation.

Much of the gem quality Olivine (called ***peridot***) comes from rocks like this one. The green olivine makes up the rock *peridotite*, this one is in a dark volcanic rock called basalt. Scattered along the base of this specimen are polished crystals of peridot.

CHEMISTRY - The Olivine Group consists of the end members:
Fayalite Fe_2SiO_4 Iron silicate
Fosterite Mg_2SiO_4 Magnesium silicate

CRYSTALLOGRAPHY - Orthorhombic

CRYSTAL GROWTH AND HABITS - Both Fayalite and Forsterite produce tabular crystals with wedge shaped terminations. They can also be granular or compact massive.

COLOR AND OTHER OPTICAL PROPERTIES - Both Fayalite and Forsterite range in color from greenish yellow through various shades of green to browns. They are commonly transparent to translucent.

HARDNESS - 6.5 - 7

SPECIFIC GRAVITY - Fayalite 4.4 ; Forsterite 3.3

LUSTER - Vitreous to resinous

STREAK - White

BREAKABILITY - Two imperfect cleavages and conchoidal fracture

OCCURRENCE - Both Fayalite and Forsterite are found in mafic and ultra-mafic igneous rocks like peridotite and dunite, and in metamorphosed impure limestones. They are also found in stony-iron meteorites.

ASSOCIATED MINERALS - Plagioclase, Phlogopite, Magnetite, Chromite, Corundum, Spinel, Augite

NAME - **Forsterite** was named in honor of Adolarius J. Forster, an English mineral collector (1739-1806).

Fayalite was named after the island Fayal (Faial) in the Azores, where specimens of the mineral were found and studied. It is now believed, however, that the mineral was dumped in the area by ships jettisoning their slag ballast.

Link to other images of Olivine.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

OLIVINE

Olivine in Basalt from Arizona.

Forsterite, a variety of Olivine

Gem quality Olivine from Arizona

Back to Olivine.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

OLIVINE

This granular Olivine is making up the green colored rock PERIDOTITE. It is believed that the peridotite originated near or at the upper mantle of Earth's interior. This chunk of peridotite was brought to the surface by volcanic eruption in southeastern Arizona. The dark gray rock surrounding the peridotite is basalt (a volcanic rock).

Back to Olivine.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

OLIVINE

Olivine, variety Fosterite, from Skardu, Nooristan, Pakistan. This crystal is an orthorhombic prism. Single, free crystals of Olivine are not common.

Back to Olivine.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

OLIVINE

Gem Olivine is called peridot. These stones have been polished in a tumbler to produce the smooth surfaces that enhance the color of the stones. Notice within the grains, the slight variations in color from the obvious green to yellowish green to brownish green. These stones came from the San Carlos Indian Reservation in southeastern Arizona.

Back to Olivine.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

ORTHOCLASE

Click on picture for a YouTube link of mineral rotation.

Orthoclase is a variety of feldspar, and this specimen shows the two good directions of cleavage, characteristic of the group. As the specimen rotates notice the flashes of light from the two vertical cleavage faces (front and back). The other two cleavage faces are on top and bottom. (Each pair of faces is a single direction of cleavage.)

CHEMISTRY - $KAlSi_3O_8$ Potassium aluminum silicate

CRYSTALLOGRAPHY - Monoclinic

CRYSTAL GROWTH AND HABITS - Orthoclase forms prismatic crystals that are typically somewhat stubby or tabular. Crystals are often twinned according to Carlsbad, Braveno or Manebach twin laws. Orthoclase can also be granular or massive.

COLOR AND OTHER OPTICAL PROPERTIES - Orthoclase can be colorless, white, tan, light yellow, salmon, buff, and even green. It may show some opalescence, and is transparent to translucent.

HARDNESS - 6 - 6.5

SPECIFIC GRAVITY - 2.5 - 2.6

LUSTER - Vitreous to pearly on cleavage faces

STREAK - White

BREAKABILITY - Very good cleavage in 2 directions producing blocky fragments; brittle

OCCURRENCE - Orthoclase is a widespread mineral in felsic igneous rocks like granite, granitic pegmatites and syenites. It is also found in cavities in basalt and in high temperature metamorphic rocks, as a result of potassium-rich metasomatic fluids.

ASSOCIATED MINERALS - Albite, Quartz, Muscovite, Biotite, Hornblende, Tourmaline, Beryl

Link to other images of Orthoclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

ORTHOCLASE

This is a single prismatic crystal.

Front View

Top View

This is a Carlsbad Twin.

Back to Orthoclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

ORTHOCLASE

This is a single crystal of orthoclase that was collected from a highly weathered granite in Nevada. The crystal shows prism faces and pinacoidal terminations.

Back to Orthoclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

ORTHOCLASE

This is a **Carlsbad Twin of Orthoclase** (front and top view).

Mineral twins are produced by irregularities in the crystal growth process, usually starting when the crystals are very small. They develop from "offsets" where a group of unit cells are trapped out of alignment, but are still linked to the symmetry of the crystal. As a result, twins grow at certain angles that are dependent on the mineral's structure, and twins are typically about the same size. In many cases, twinned crystals can be identified by their "re-entrant" angles, which are grooves that separate one crystal's structure from another.

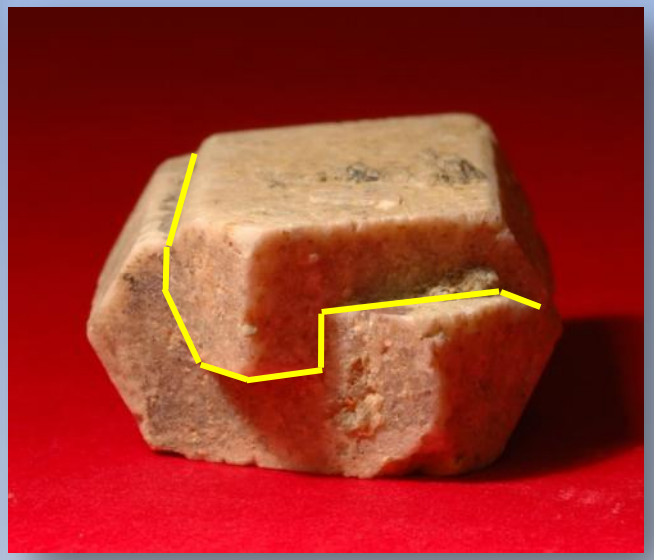
Click **HERE** to see the re-entrant angles in the above crystals. (At least the visible ones.)

Back to Orthoclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

ORTHOCLASE



This is a **Carlsbad Twin of Orthoclase** (front and top view).

Mineral twins are produced by irregularities in the crystal growth process, usually starting when the crystals are very small. They develop from "offsets" where a group of unit cells are trapped out of alignment but still linked to the symmetry of the crystal. As a result twins grow at certain angles that are dependent on the minerals structure and twins are typically the same size. In many cases twinned crystals can be identified by their "re-entrant" angles which are grooves that separate one crystal's structure from another.

BACK TO THE PREVIOUS PAGE

Back to Orthoclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PLAGIOCLASE

Click on picture for a YouTube link of mineral rotation.

This is a typical cleavage fragment of Albite. It has a very good cleavage that makes for nice clean, flat faces.

SPECIES	% SODIUM	% CALCIUM	SPECIFIC GRAVITY	COLOR	OCCURRENCE
ALBITE	100-90	0-10	2.60-2.65	White to colorless	Granite pegmatites
OLIGOCLASE	90-70	10-30	2.63-2.66	White to slightly greenish	Monzonites, granodiorites, also in granitic pegmatites
ANDESINE	70-50	30-50	2.66-2.68	Colorless to white to greenish yellow	Andesites and diorites
LABRADORITE	50-30	50-70	2.68-2.72	Grayish, bluish, greenish with iridescence along cleavage planes	Both occur as small to large grains in gabbros and anorthosites.
BYTOWNITE	30-10	70-90	2.72-2.74	White to grayish	
ANORTHITE	10-0	90-100	2.74-2.76	White to grayish and reddish	Limestones that have undergone contact metamorphism

CHEMISTRY - $NaAlSi_3O_8$ to $CaAl_2Si_2O_8$
Sodium – Calcium Aluminum Silicate
CRYSTALLOGRAPHY – Triclinic, pinacoidal
CRYSTAL GROWTH AND HABITS – Massive to granular
HARDNESS – 6
LUSTER - Vitreous
STREAK - White
BREAKABILITY - 2 good directions of cleavage producing prismatic fragments
OCCURRENCE – Typically found in igneous rocks.

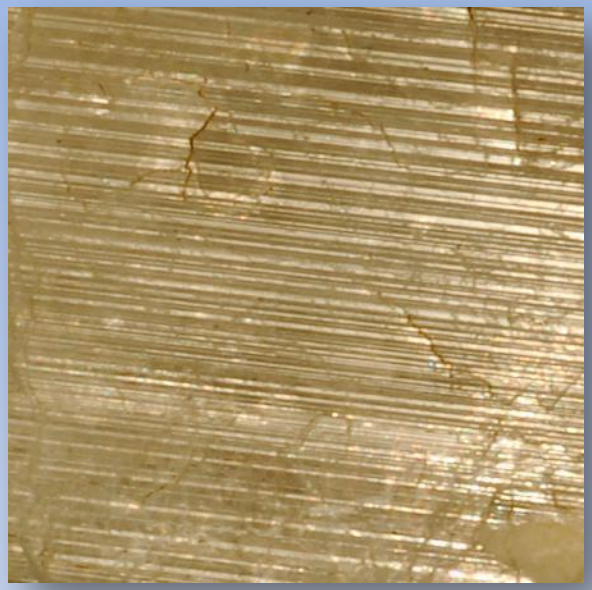
Link to other images of Plagioclase

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PLAGIOCLASE

This is a cleavage fragment of the variety of Plagioclase called Albite (the sodium- rich end member). To see the light reflect from the front cleavage face click **HERE**.



This image is a close-up view of Albite (the specimen on the left) and shows the twinning striations (the parallel light and dark lines). Plagioclase feldspars are commonly twinned, and this feature is often used to identify them.

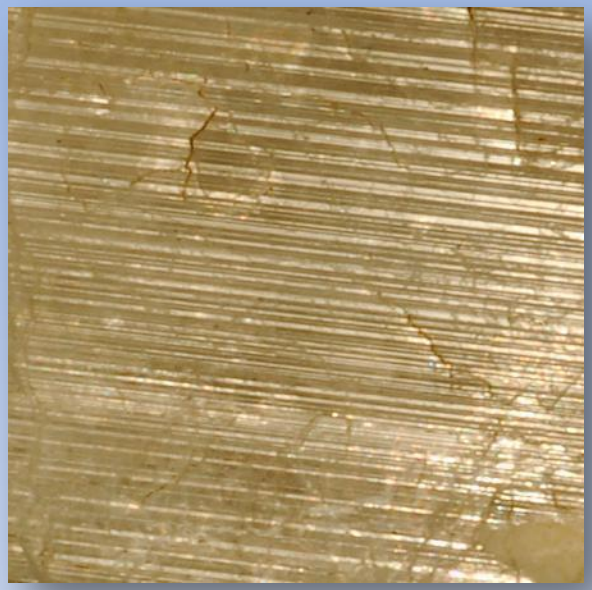
Back to Plagioclase.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PLAGIOCLASE

To go back to the previous picture, click **HERE**.



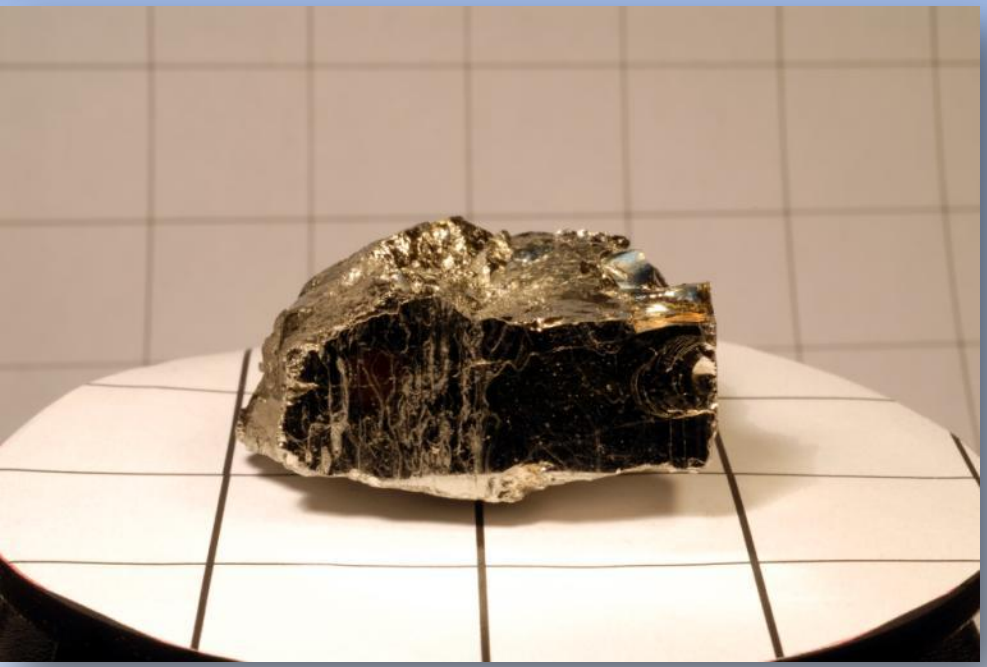
This image is a close-up view of Albite (the specimen on the left) and shows the twinning striations (the parallel light and dark lines). Plagioclase feldspars are commonly twinned, and this feature is often used to identify them.

Back to Plagioclase.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYRITE



Click on picture for a YouTube link of mineral rotation.

This specimen typifies how you may encounter Pyrite in the field. It is a portion of a crystal with two partial faces. The rest has been broken to show conchoidal fracture. It also shows the metallic luster and the brassy yellow color that are important properties of the mineral.

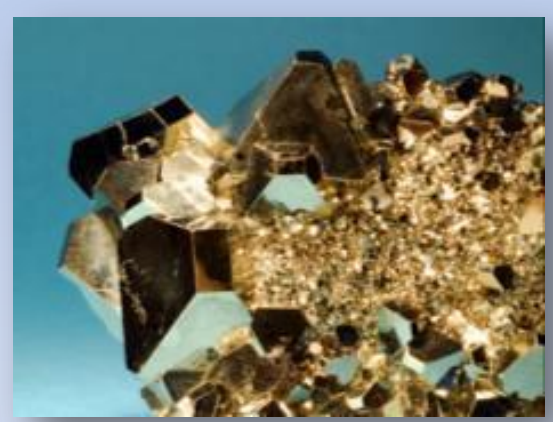
CHEMISTRY - FeS_2 Iron sulfide
CRYSTALLOGRAPHY - Isometric (Cubic)
CRYSTAL GROWTH AND HABITS - Pyrite commonly forms cubes, as well as octahedrons and pyritohedrons. The faces of the pyrite cubes are often striated.
COLOR AND OTHER OPTICAL PROPERTIES - Pale brass yellow to a brassy golden color, may be slightly iridescent when tarnished, opaque
HARDNESS - 6 - 6.5
SPECIFIC GRAVITY - 5.018
LUSTER - Metallic
STREAK - Black with a slight greenish or brownish color
BREAKABILITY - Uneven to conchoidal fracture
OCCURRENCE - Pyrite is a common mineral formed by moderate to high temperature hydrothermal fluids, common as a sulfide vein mineral. It may also be formed in magma bodies and is an accessory mineral in igneous rocks. Pyrite can be found as scattered crystals in sedimentary rocks associated with coal, and in concretions. It is also found in metamorphosed sediments and in chlorite schists.

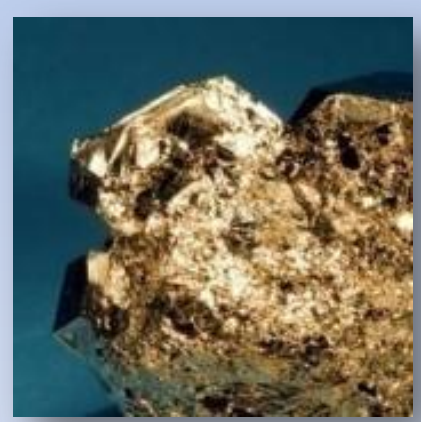
Link to other images of Pyrite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYRITE



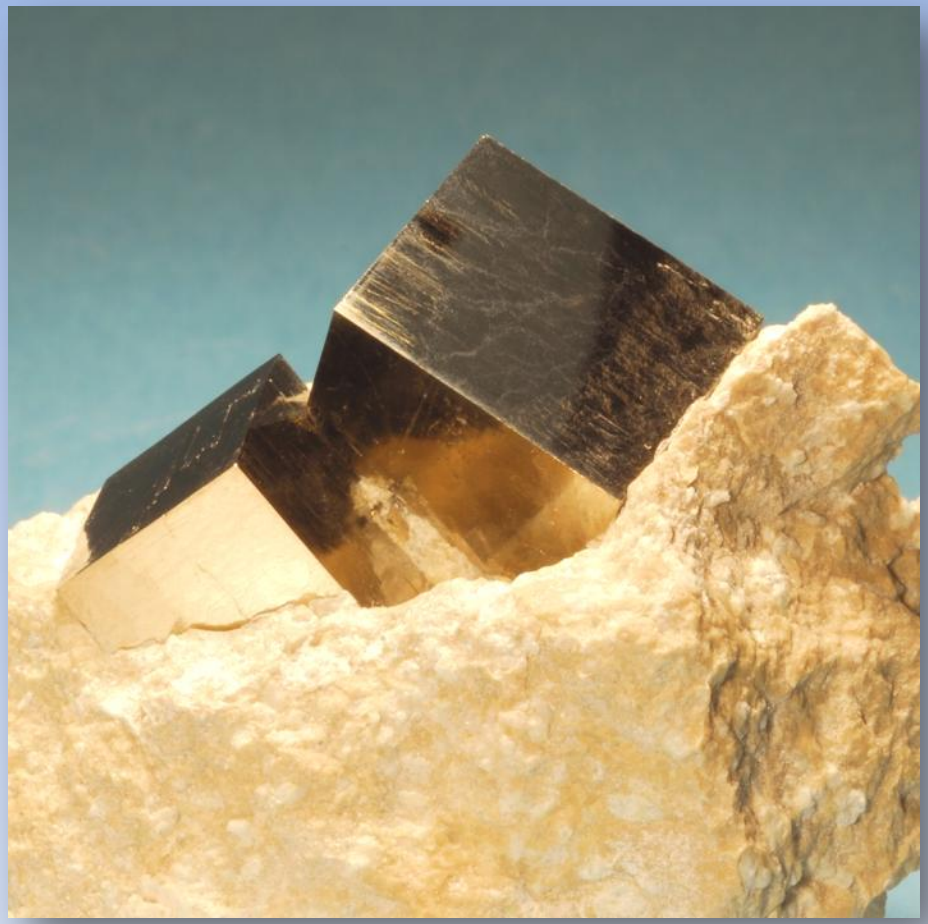


Back to Pyrite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYRITE



These are well-formed cubes of Pyrite that grew in the clay in which they are found. The clay matrix did not restrict the growth of the crystals, and allowed the crystals to grow to near perfection.

These crystals are from Spain.

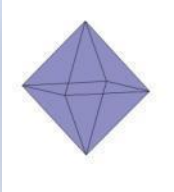
Back to Pyrite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYRITE

The image on the left shows very nicely formed octahedral crystals truncated by the cubic form. The image on the right is the back side view, showing the irregular to somewhat sub-conchoidal fracture found in Pyrite.



This is the octahedral crystal form.

Back to Pyrite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYROXENE GROUP
AUGITE

Click on picture for a YouTube link of mineral rotation.

As the image rotates, note the very flat cleavage face on the back and the subtle flashes of light from other, smaller cleavage faces.

CHEMISTRY - $(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al)_2O_6$ Calcium sodium magnesium iron aluminum titanium silicate
CRYSTALLOGRAPHY - Monoclinic
CRYSTAL GROWTH AND HABITS - Augite forms stubby prismatic crystals, and can also be found as granular to massive.
COLOR AND OTHER OPTICAL PROPERTIES - Black to yellow brown
HARDNESS - 5 - 6
SPECIFIC GRAVITY - 3.2 - 3.4
LUSTER - Augite is vitreous to sub-vitreous and dull, it may also be resinous. It is translucent to opaque.
STREAK - Gray green
BREAKABILITY - Augite has good prismatic cleavage (two directions) at nearly 90° (87° and 93°).
OCCURRENCE - Augite is an important rock-forming mineral in mafic and ultra-mafic igneous rocks. It is also found in high temperature metamorphic rocks.
ASSOCIATED MINERALS - Orthoclase, Sanidine, Labradorite, Olivine, Amphiboles and other Pyroxenes.

Augite Cleavage

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYROXENE GROUP
AUGITE

The blocky **(nearly 90^{o} angle of cleavage)** found in Augite is the focus of this image.

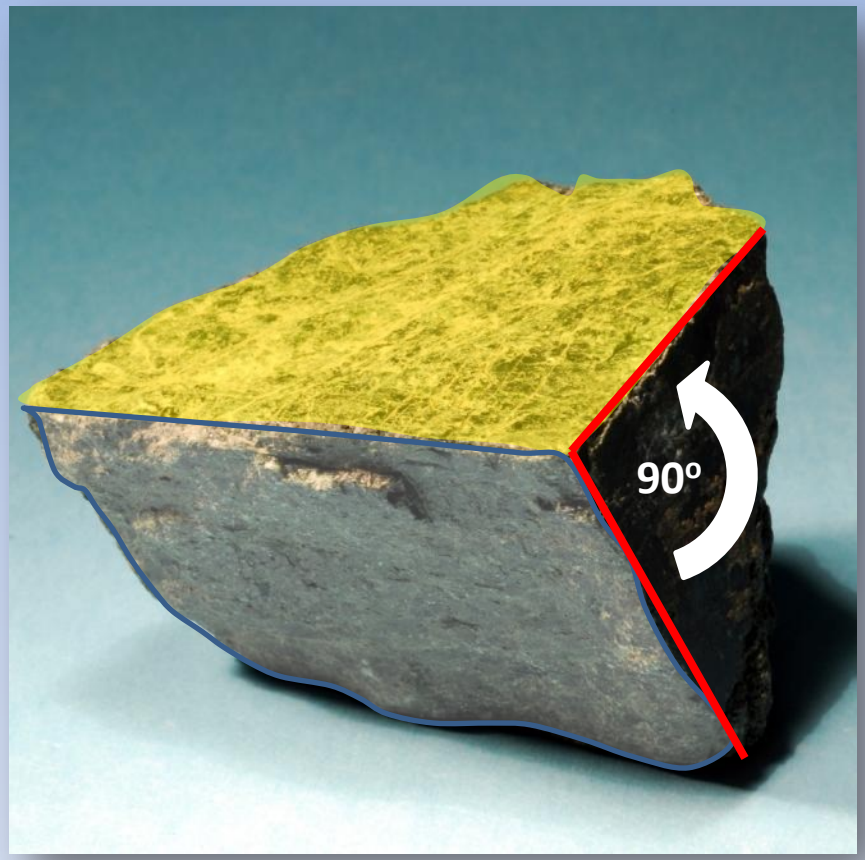
Follow this **LINK** to see the cleavages.

Back to Pyroxene

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PYROXENE GROUP
AUGITE



The blocky **(nearly 90° angle of cleavage)** found in Augite is the focus of this image.

Click **HERE** to go back.

Back to Pyroxene

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

QUARTZ

Click on picture for a YouTube link of mineral rotation.

This is a fragment of a large, clear Quartz crystal. As it rotates you can see the curved conchoidal fractures that are typically well-developed in Quartz (as well as other homogenous materials). The black included crystals are tourmaline. This specimen is from Brazil.

CHEMISTRY - SiO_2 Silicon oxide
CRYSTALLOGRAPHY - Trigonal (Trigonal trapezohedral)
CRYSTAL GROWTH AND HABITS - Crystals can develop in a variety of ways, most commonly as hexagonal prisms terminated with pyramid-like rhombohedral faces. It is also commonly microcrystalline, as in chalcedony and chert.
COLOR AND OTHER OPTICAL PROPERTIES - Quartz has a wide range of colors, as it is easily tinted by minor amounts of impurities. Colors include white, pink, yellow, brown, green, purple, gray and black. It is transparent to nearly opaque.
HARDNESS - 7
SPECIFIC GRAVITY - 2.65
LUSTER - Vitreous
STREAK - White
BREAKABILITY - Conchoidal fracture, brittle
OCCURRENCE - Quartz is very common in the felsic igneous rocks like granite and granitic pegmatites. It is the dominant mineral in most sandstones and in quartzites.

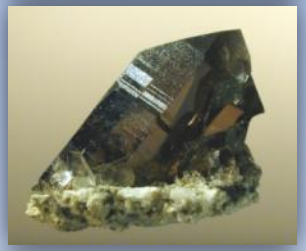
Link to other images of Quartz.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

QUARTZ

Herkimer Diamond, NY



Smoky Quartz, NM

Petrified Wood, AZ

Drusy Quartz, Clifton, AZ

Crystal Cluster, Peru

Bullseye Agate, Brazil

Amethyst Scepters, AZ

Amethyst, Vera Cruz, Mexico

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

QUARTZ – HERKIMER DIAMOND

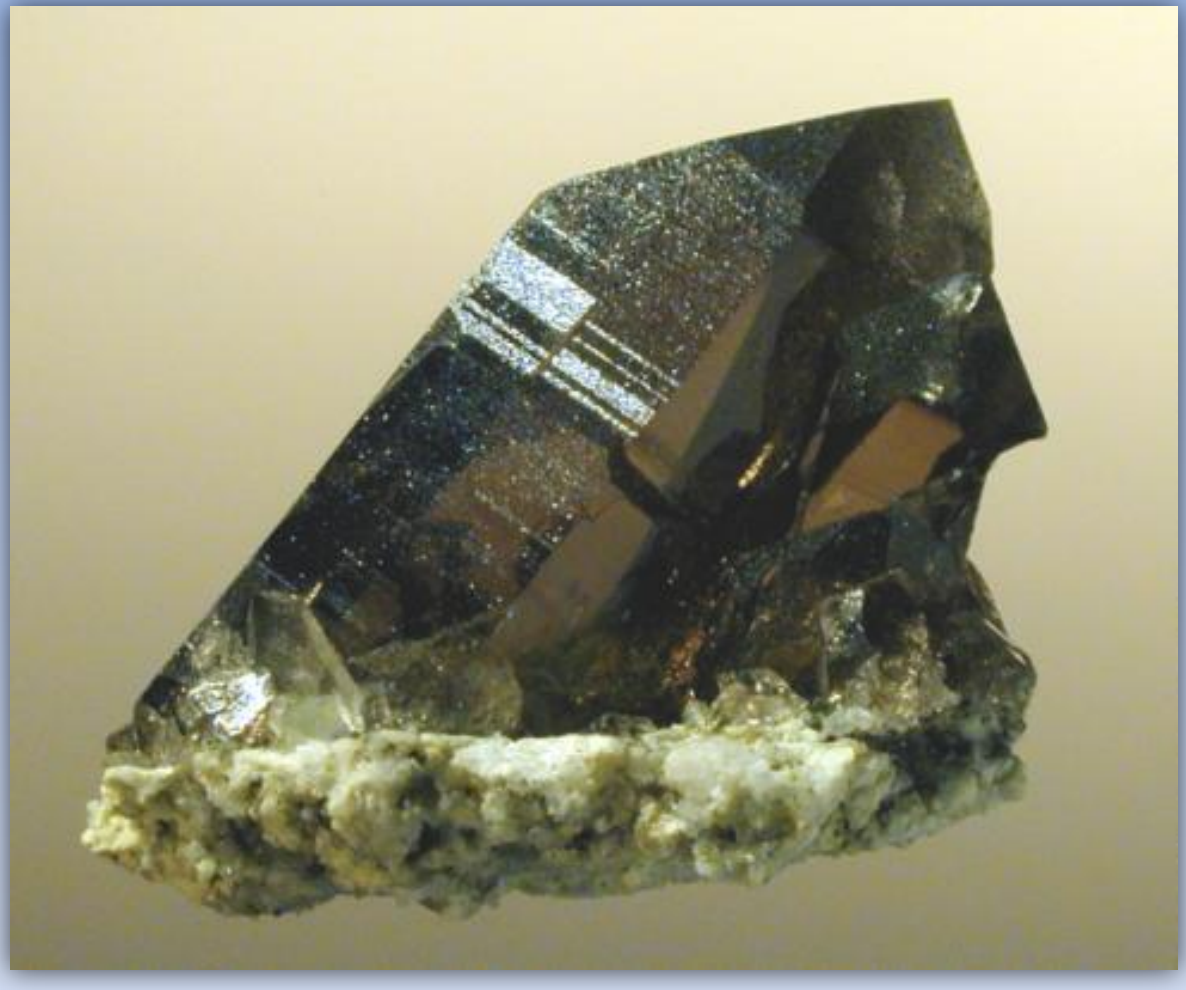
Herkimer “Diamonds” are actually very well-formed Quartz crystals that grew in the sedimentary rock, dolomite. The crystals grew in vugs (empty cavities in the rock). Some of the larger vugs have yielded bushel baskets of the nearly perfect crystals. Some of the crystals contain water droplets and others bits of the black organic matter seen coating this vug in the dolomite. Herkimer is a small town in central New York and this crystal was collected at a fee area called the Ace of Diamonds.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SMOKY QUARTZ



This smoky Quartz crystal is from the central mountains of New Mexico and shows the prism and rhombohedral termination on top (‘pyramid’). The dark color of smoky Quartz is created naturally by radiation from nearby radioactive minerals. The radiation disrupts the crystal structure, to produce the smoky color.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

PETRIFIED WOOD

Most petrified wood was produced by the slow replacement of the wood tissue by Quartz. In this case, the replacement was so good that the cellular structure is preserved, as seen in the close-up image on the left. The Quartz crystals in this type of Quartz are so small they are called cryptocrystalline (crypto – hidden).

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

DRUSY QUARTZ

Drusy means small and sugary, but with a sparkle. This group of crystals formed as a thick silicate gel solidified. The white drusy area represents very small crystals that have included droplets of water (hence the white color). Along the edges the Quartz had longer to crystallize, and that allowed the development of larger, more distinct, crystals.

The rock on the cluster rests is a weathered mass of basalt.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

QUARTZ CLUSTER

This attractive cluster of quartz, from Peru, shows the prismatic nature of the crystals very nicely. Clusters of crystals of many minerals can start their growth in many different directions. The crystals that grow upward and out, away from the base, will continue to receive nutrients from the solution, and grow. The others bump into other crystals and stop growing. The small dark crystals along the base are chalcopyrite crystals.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

BULLSEYE AGATE

In general, agates consist of microscopic crystals of Quartz. Agates also fill voids in other types of rock, notably volcanic rocks. In this specimen, the void was filled with an aqueous solution that deposited a thin layer of agate, that completely coated the void. A change in the solution caused a new deposit of agate with a slightly different shade. Layer upon layer was deposited, until the void was completely filled. The colors of this agate are due to iron.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

QUARTZ SCEPTERS

A scepter is a symbol of authority for royalty. Typically, it is a staff topped by a large jewel or cluster of jewels. Quartz scepters commonly have milky prisms with an enlarged termination of amethyst – the jewel atop the staff. No definitive answer has been provided for why they occur. Occasionally Quartz crystals have scepters on both ends.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

AMETHYST

Quartz that has a purple or violet color is called amethyst. The color is due to ions of iron that are included, as impurities within the Quartz. Certainly, this impurity increases the value of the Quartz. This cluster developed in pockets (or vugs) within volcanic rocks.

Back to Quartz

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SPHALERITE

Click on picture for a YouTube link of mineral rotation.

These specimens of Sphalerite show many cleavage faces flashing in the light as they rotate. Note also the brownish color and the resin-like luster.

CHEMISTRY - ZnS Zinc sulfide
CRYSTALLOGRAPHY - Cubic
CRYSTAL GROWTH AND HABITS - The common forms are tetrahedral and dodecahedral, with many complex and distorted growths. Sphalerite can also be botryoidal, stalactitic, and coarse- to fine-grained massive.
COLOR AND OTHER OPTICAL PROPERTIES - The color of Sphalerite ranges from colorless to dark brown, gray to black. It is commonly brown, yellow, reddish or greenish.
HARDNESS - 3.5 - 4
SPECIFIC GRAVITY - 3.9 - 4.1
LUSTER - Resinous to sub-metallic
STREAK - Light yellow
BREAKABILITY - Very good {011} cleavage (dodecahedral - six sided), the fracture is uneven to conchoidal. Sphalerite is brittle.
OCCURRENCE - Sphalerite forms in a variety of environments including low to high temperature hydrothermal, as well as in coal and limestone deposits.
ASSOCIATED MINERALS - Galena, Chalcopyrite, Marcasite, Pyrite, Fluorite, Barite, Quartz and Calcite.
MINERAL NAME - From the Greek for *treacherous,* in reference to its confusion with Galena

Link to other images of Sphalerite.

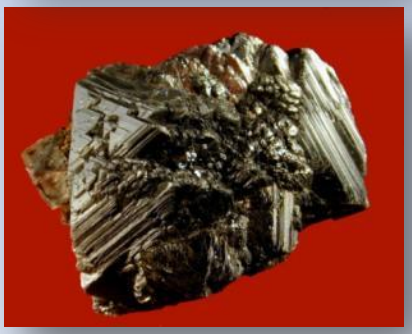
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SPHALERITE

Small crystals in dolomite.

Black crystals from Joplin, MO



Tetrahedral crystal form

Back to Sphalerite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SPHALERITE

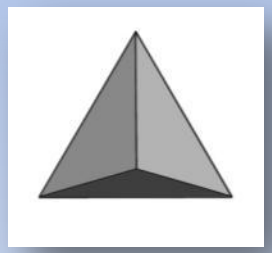
Sphalerite often forms very complex crystals. These crystals are a good example of that. They formed in pockets of the sedimentary rock dolomite. Associated with each are crystals of the mineral dolomite.

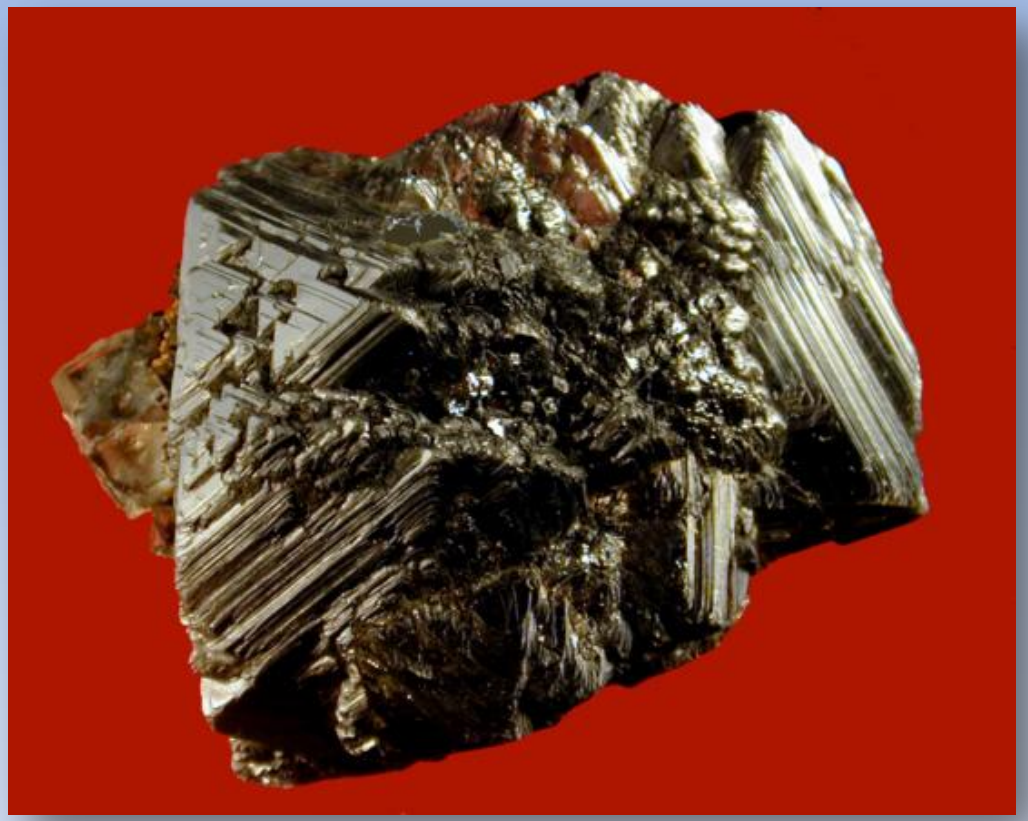
Back to Sphalerite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SPHALERITE





This is an intergrown group of tetrahedral crystals of Sphalerite. The crystals have many offsets, as evidenced by the many step-like lines and the triangular faces on the left of the crystal. These offsets are imperfections that were produced as the crystal was growing.

Back to Sphalerite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

SPHALERITE

An idealized tetrahedron. It is a 3 sided pyramid with a flat, triangular base.

This is the best example of a tetrahedron from the image on the right.

These black crystals of Sphalerite are on chert, and show the tetrahedral form in the top left crystal, and the tetrahedral form modified by the cube, in the large crystal on the right.

Back to Sphalerite.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TALC

Click on picture for a YouTube link of mineral rotation.

This is a pink-colored Talc specimen from Texas. It consists of millions of individual microscopic scaly crystals. They cleave very easily to produce talc's lubricating feature.

CHEMISTRY - $Mg_3Si_4O_{10}(OH)_2$ Magnesiuim silicate hydroxide

CRYSTALLOGRAPHY - Monoclinic or Triclinic

CRYSTAL GROWTH AND HABITS - Crystals of Talc are platy to tabular, and sometimes pseudo-trigonal. It typically forms compact masses, but can also be fibrous.

COLOR AND OPTICAL PROPERTIES - Color varies from white through dark green, brown or pinkish.

HARDNESS - 1

SPECIFIC GRAVITY - 2.58 - 2.83

LUSTER - Pearly, greasy or dull

STREAK - White

BREAKABILITY - Perfect cleavage in one direction; and it is sectile.

OCCURRENCE - Talc occurs in altered mafic rocks. It can also be formed by low temperature metamorphism of silica-rich dolomites.

ASSOCIATED MINERALS - Serpentine, Actinolite, Tremolite, Pyroxene, Chlorite, Anthophyllite, Dolomite, Calcite

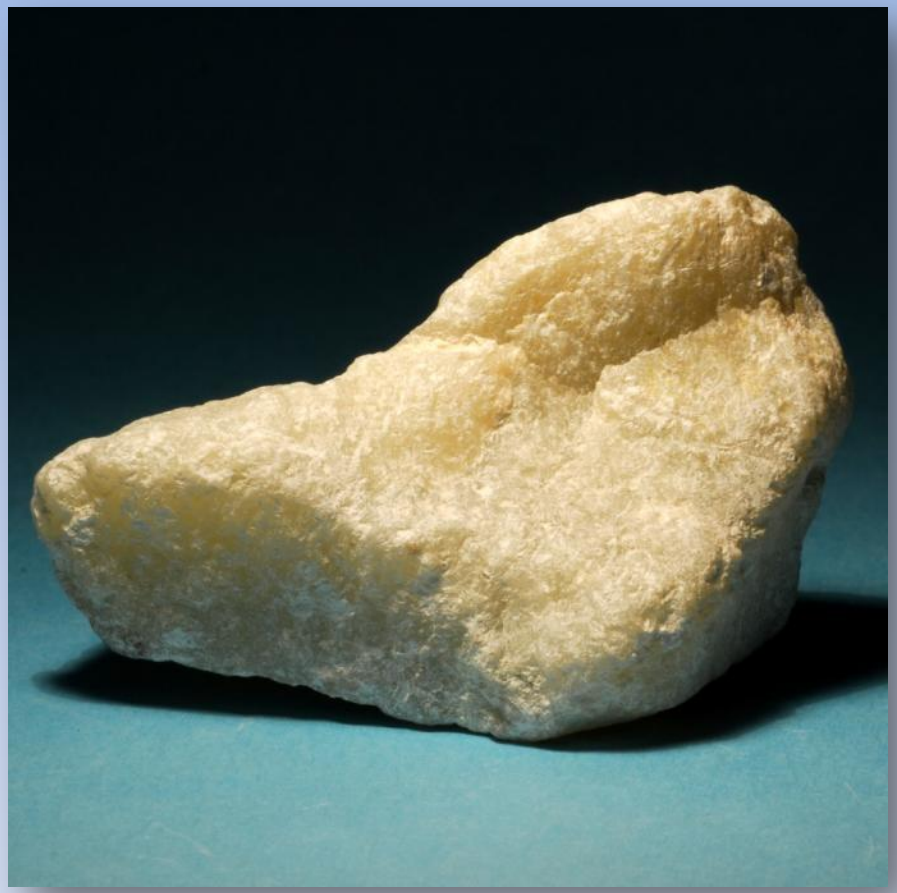
MINERAL NAME - Questionable origin, but probably from Arabic.

Link to other images of Talc.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TALC



This nearly white Talc is the type from which talcum powder is named. The extreme softness and ease of cleavage provide the lubrication effect found in talcum powder. …just add a little perfume.

Back to Talc.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

Click on picture for a YouTube link of mineral rotation.

These black crystals of Tourmaline are known as Schorl. The crystal is part of a pegmatite vein found in the Bradshaw Mountains of Arizona.

The Tourmaline crystals are associated with quartz (light gray) and pinkish-orange feldspar.

CHEMISTRY - $Na(Li,Al)_3Al_6Si_6O_{18}(BO_3)_3(OH)_4$, (But varies tremendously)

CRYSTALLOGRAPHY - Trigonal

CRYSTAL GROWTH AND HABITS - Tourmalines commonly form long prismatic crystals, up to several feet in length. The crystals also often form in loosely radiating clusters. Single crystals may have a flat (pinacoidal) termination on one and a rhombohedral (3 sided) termination on the other, thus demonstrating hemimorphism (different crystal forms on each end).

COLOR AND OTHER OPTICAL PROPERTIES -- Any color, opaque to transparent

HARDNESS - 7 - 7.5

SPECIFIC GRAVITY - 3.0 - 3.3

LUSTER - Vitreous

STREAK - White

BREAKABILITY - Species of the Tourmaline Group have poor prismatic cleavage, and uneven to conchoidal fracture.

OCCURRENCE - Found in coarse-grained igneous rocks and pegmatites. Tourmalines are also found in mica schists.

ASSOCIATED MINERALS - Quartz and feldspars

NAME - from "turamali", a name given to early gems from Ceylon

Schorl - Perhaps from the old German "schurl" meaning impurity

Uvite - Named for its occurrence in the Uva Province in Sri Lanka

Elbaite - From its occurrence on the island of Elba, Italy

Dravite - Named after the Drava River in Austria and Slovenia

Link to other images of Tourmaline.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

Each image can be “clicked” for more information.

Prismatic Schorl

Green Tourmaline

Green Tourmaline
in quartz

Variations of color
in Tourmaline

Back to Tourmaline

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

SCHORL

Schorl is by far the most common species of Tourmaline. It has a complicated formula:

$[Na][Fe_3^{2+}][Al_6][(OH)_3|OH|(BO_3)_3[Si_6O_{18}]$

It is the iron-rich member of the group and is black in color. This nice single crystal displays the striations that parallel the long axis of the crystal, a very common feature in all species of Tourmaline.

Back to Tourmaline

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

This is a nice grouping of Tourmaline and quartz crystals. This variety of Tourmaline is Elbaite and is commonly green to red or pinkish in color. Note that in the central crystal there is a range in colors. This is very common for Tourmalines.

Back to Tourmaline

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

Nice prismatic crystals of Elbaite with the common prismatic striations. Note the gemmy translucent part of the crystal on the right.

Back to Tourmaline

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TOURMALINE

Elbaite Tourmaline in quartz from Brazil. Which came first? In a pegmatite vein the quartz, feldspars and micas are typically the last to form. Here the very well formed Elbaite crystals must have formed in an open and free environment. Later, the quartz filled in the vein.

Back to Tourmaline

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TURQUOISE

Click on picture for a YouTube link of mineral rotation.

This is a typical nugget of Turquoise. It is from the Sleeping Beauty Mine in Arizona.

CHEMISTRY - $CuAl_6(PO_4)_4(OH)_8 \cdot 2H_2O$ Copper aluminum phosphate hydrate

CRYSTALLOGRAPHY - Triclinic

CRYSTAL GROWTH AND HABITS - Turquoise crystals are very rare, but form steep pinacoids. Most commonly Turquoise is cryptocrystalline and forms nodules.

COLOR AND OTHER OPTICAL PROPERTIES - Turquoise is typically some shade of blue to bluish-green or green. It is translucent (in thin pieces) to opaque.

HARDNESS - 5 -6

SPECIFIC GRAVITY - 2.8 - 2.9

LUSTER - Dull to waxy, crystals are vitreous

STREAK - White to pale blue

BREAKABILITY - Conchoidal, usually producing smooth surfaces

OCCURRENCE - Turquoise is produced in the alteration zone of copper deposits when potassium is present.

ASSOCIATED MINERALS - Kaolinite, Pyrite, Montmorillonite

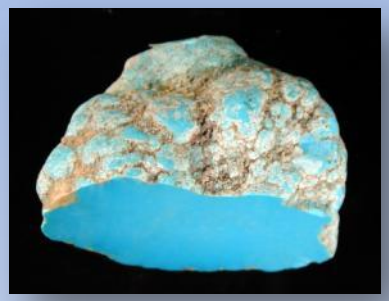
NAME - from the French "turquie" for its color.

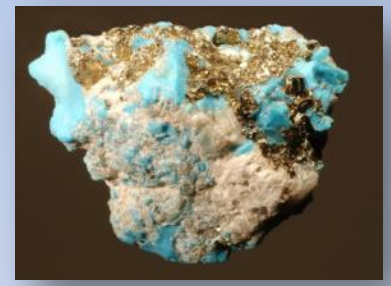
Link to other images of Turquoise.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TURQUOISE





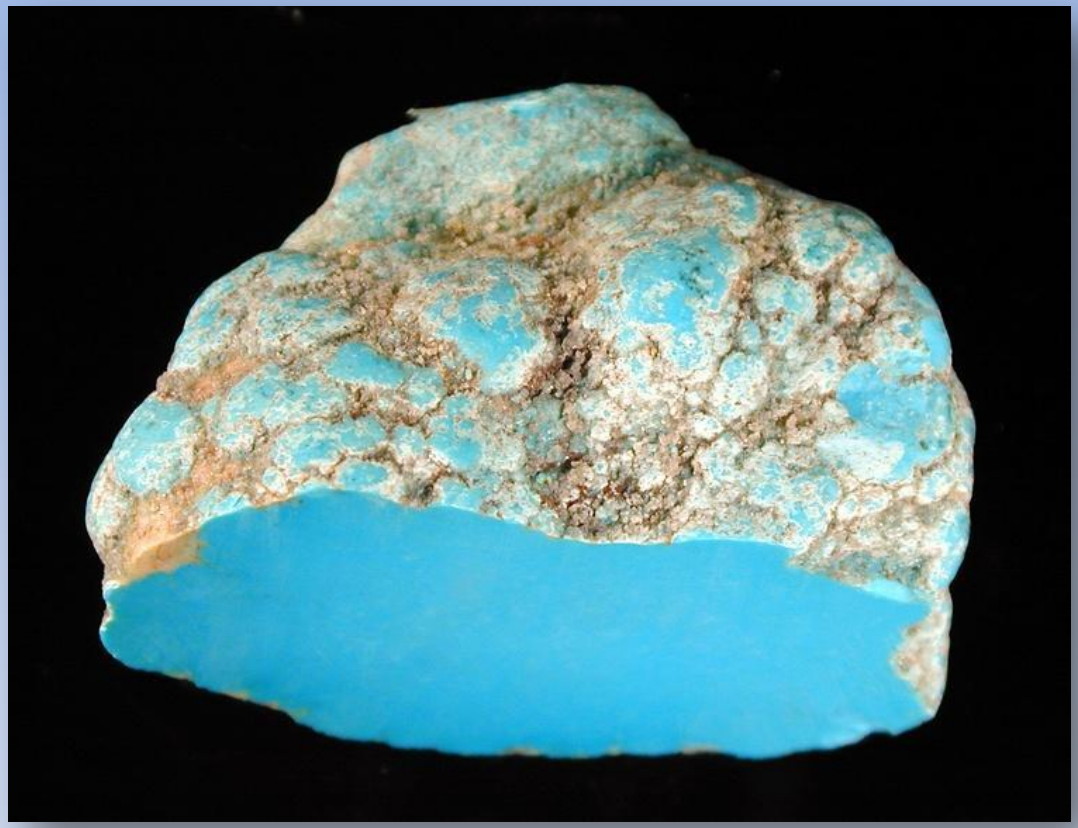
Two natural pieces of Turquoise.

Back to Turquoise

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TURQUOISE



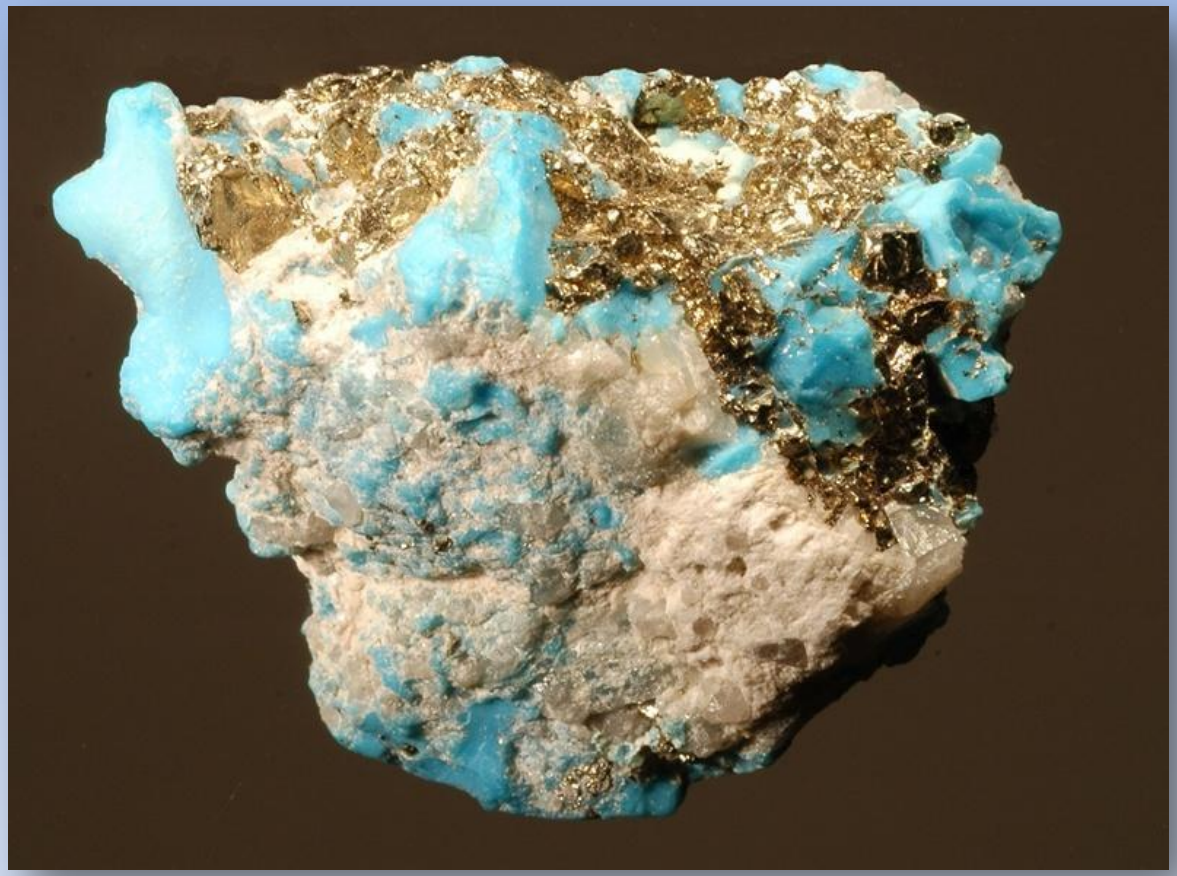
This chunk of turquoise has been cut along its base with a diamond saw, and then polished, to show the color which is so characteristic of the mineral.

Back to Turquoise

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

TURQUOISE



This specimen is from a copper mine in Cananea, Mexico. It is associated with pyrite (metallic grains) and quartz (white). This turquoise is soft and breaks easily, so after it is collected at the mine, it is treated with epoxy resins to stabilize it. "Stabilized" turquoise is fairly common in the jewelry business.

Back to Turquoise

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to Page 1

UNKNOWN MINERALS PAGE

- Mineral 1
- Mineral 2
- Mineral 3
- Mineral 4
- Mineral 5
- Mineral 6
- Mineral 7
- Mineral 8
- Mineral 9
- Mineral 10
- Mineral 11
- Mineral 12

This is a link to a work/answer sheet. As you look at and analyze each mineral you should keep track of your data by recording it on this sheet.

Print out the work/answer sheet but
DO NOT PRINT THE ENTIRE POWERPOINT (!)
(It is put in sideways so it prints out to a larger size.)

A series of tools are provided so that you may test each mineral's physical properties. Click **HERE** to get an explanation of the tools.

Each mineral box is linked to an image of that mineral.

Each of the 20 minerals is linked back to this page.

Back to Page 1

EXPLANATION OF TOOLS

Back to the Unknown Minerals Page

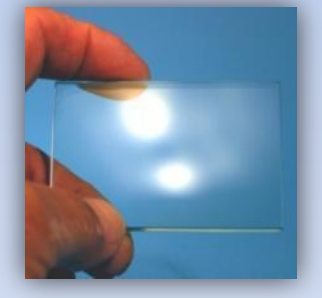
The **hammer** is used to break the mineral, to observe its fracture or cleavage. This will not be available for all specimens. When it is not, an explanation will be given.

Hydrochloric acid is dropped onto the mineral. The image shows bubbling if a positive reaction occurs. The acid test will not be provided for metallic minerals, as none of them react.

The mineral is rubbed across the **streak plate** to show the color of the mineral's powder.

A **magnet** is used to see if a small chip of a mineral is attracted to it, and thus is magnetic. This will be available only for metallic minerals.

This **copper wire** is used to try and scratch the surface of the mineral.



The mineral is rubbed across the **glass plate** to determine if the mineral scratches it or not.

The weight of the mineral in air and the weight of the mineral in water is provided so that a calculation of **specific gravity** can be determined. The formula is that -- specific gravity equals the weight of the (mineral in air), divided by the (weight in air) minus the (weight in water).
NOTE: The specific gravity is dependent on the purity of the sample and should be used as an approximation (+ or – 1 or 1.5). Be sure to use other properties in conjunction with it.

Back to the Unknown Minerals Page

Back to Page 1

Mineral Identification Work Sheet

Mineral Number	Light or Dark	Luster	Hardness	Cleavage	Streak	Specific Gravity	Reaction to Acid	Magnetic	Mineral Name
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

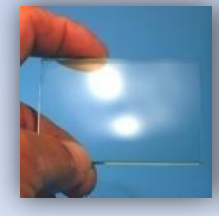
Back to the Unknown Minerals Page

Back to Page 1

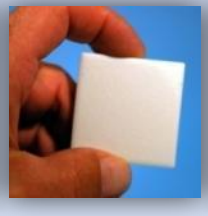
UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 1








BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

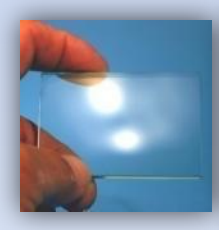
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

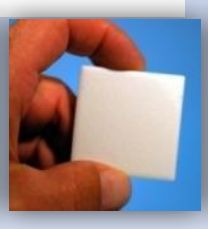
UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 2








BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

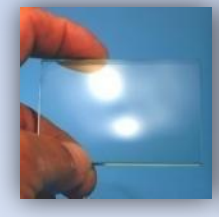
Back to Page 1

UNKNOWN MINERALS

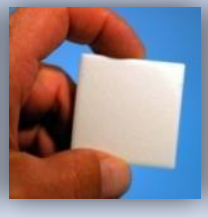
These are crystal points on top of the specimen.

Click on Mineral for Rotation

Mineral 3







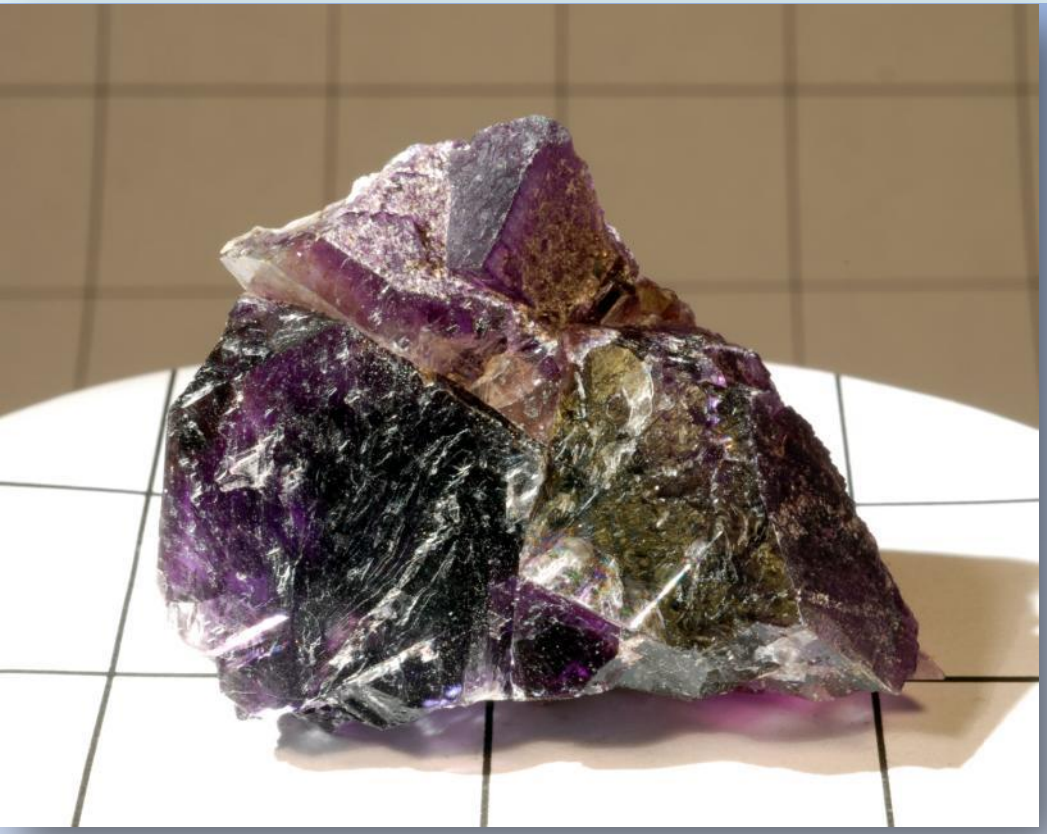

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

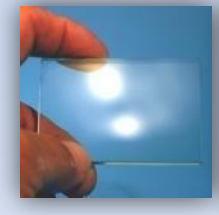
Back to Page 1

UNKNOWN MINERALS

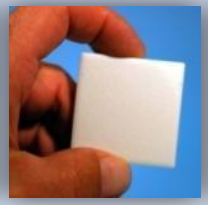


Click on Mineral for Rotation

Mineral 4








BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

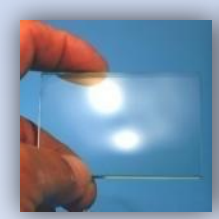
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

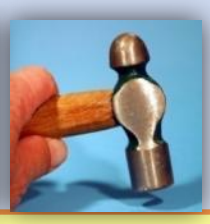
UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 5





BACK TO THE ALPHABETICAL LIST OF MINERALS

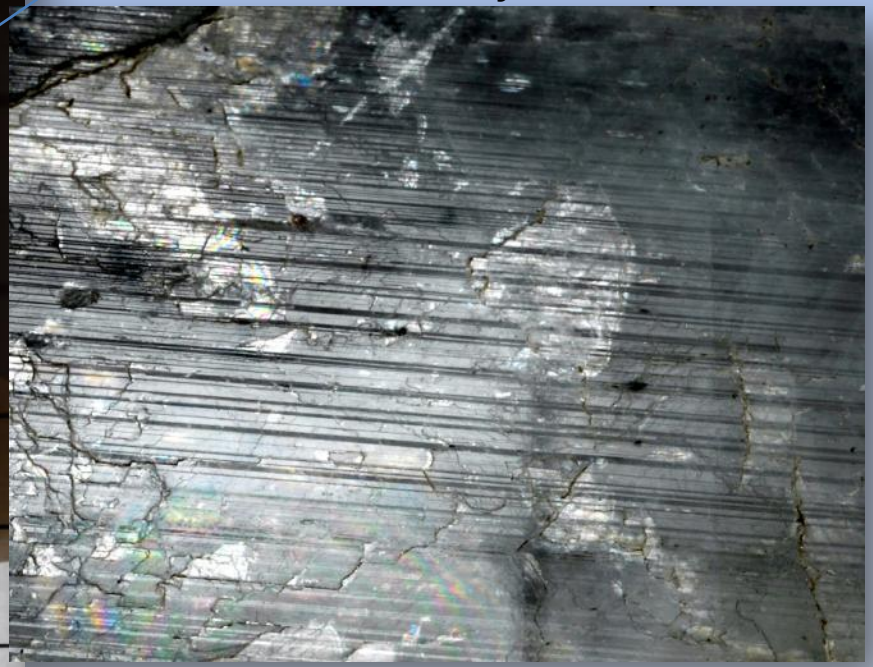
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

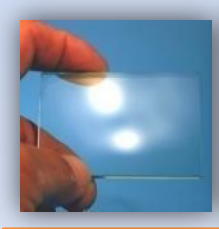
UNKNOWN MINERALS

This image is a close up of the area indicated by the arrow.



Click on Mineral for Rotation

Mineral 6





This specimen is a cleavage fragment.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

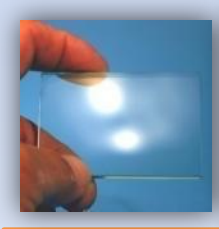
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 7






This specimen contains microscopic crystals so no cleavage could be seen.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

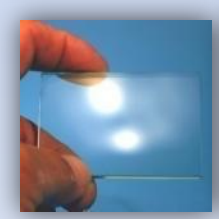
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 8





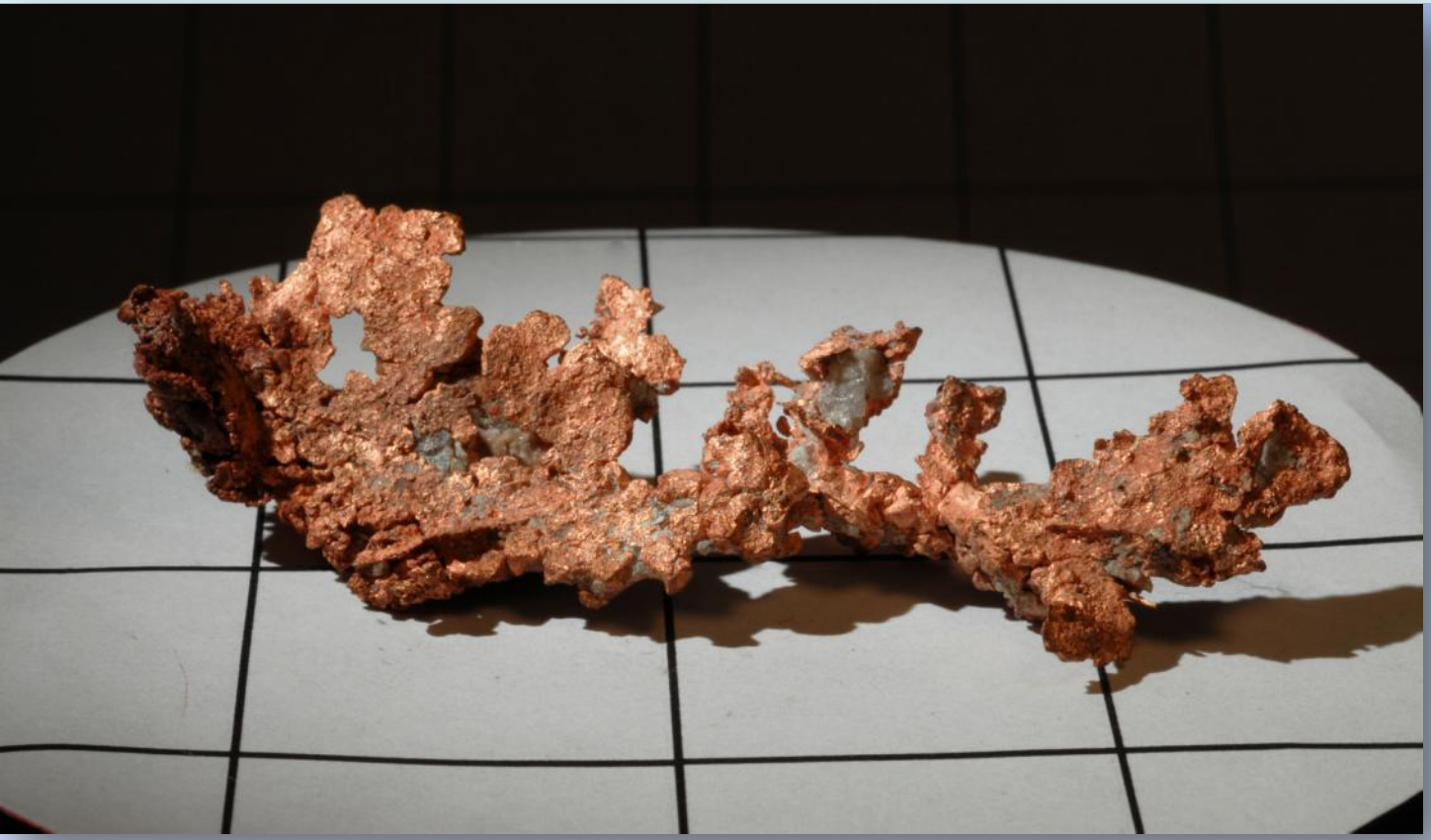

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

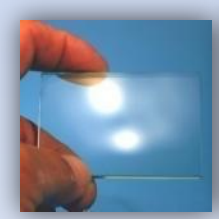
Back to Page 1

UNKNOWN MINERALS



Click on Mineral for Rotation

Mineral 9






BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

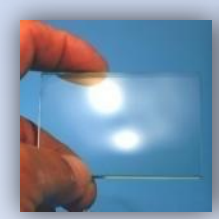
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 10






BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

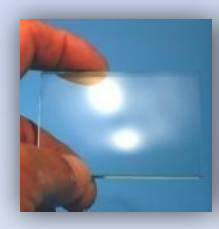
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

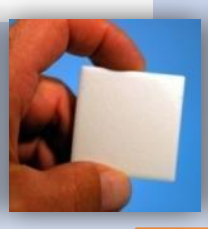
UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 11








These are nice crystals and I could not bring myself to break them… use other properties.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

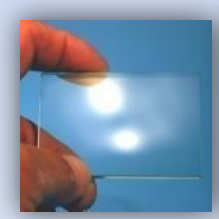
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

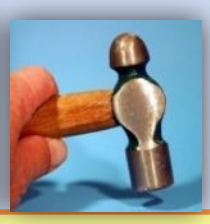
UNKNOWN MINERALS

Click on Mineral for Rotation

Mineral 12





BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 1

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{35.3\text{g}}{(35.3\text{g}) - (19\text{g})}$$

BACK TO UNKNOWN #1

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 2

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEiGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{100.1\text{g}}{(100.1\text{g}) - (61.5\text{g})}$$

BACK TO UNKNOWN #2

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 3

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{140.6\text{g}}{(140.6\text{g}) - (86.2\text{g})}$$

BACK TO UNKNOWN #3

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 4

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{30.5\text{g}}{(30.5\text{g}) - (21.4\text{g})}$$

BACK TO UNKNOWN #4

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 5

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{205.3\text{g}}{(205.3\text{g}) - (131.8\text{g})}$$

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO UNKNOWN #5

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 6

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{110.7\text{g}}{(110.7\text{g}) - (69.7\text{g})}$$

BACK TO UNKNOWN #6

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 7

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{75.8\text{g}}{(75.8\text{g}) - (55.8\text{g})}$$

BACK TO UNKNOWN #7

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 8

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{145.1\text{g}}{(145.1\text{g}) - (116.3\text{g})}$$

BACK TO UNKNOWN #8

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 9

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{110.4\text{g}}{(110.4\text{g}) - (96.6\text{g})}$$

BACK TO UNKNOWN #9

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 10

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{45.2\text{g}}{(45.2\text{g}) - (35.8\text{g})}$$

BACK TO UNKNOWN #10

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 11

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{115.2\text{g}}{(115.2\text{g}) - (86.5\text{g})}$$

BACK TO UNKNOWN #11

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

SPECIFIC GRAVITY MEASUREMENTS MINERAL 12

$$\text{SPECIFIC GRAVITY} = \frac{\text{WEIGHT OF MINERAL IN AIR}}{(\text{WEIGHT OF MINERAL IN AIR}) - (\text{WEIGHT OF MINERAL IN WATER})}$$

$$\text{SPECIFIC GRAVITY} = \frac{70.9\text{g}}{(70.9\text{g}) - (52.6\text{g})}$$

BACK TO UNKNOWN #12

KEEP IN MIND THAT THIS IS AN APPROXIMATION

BACK TO THE ALPHABETICAL LIST OF MINERALS

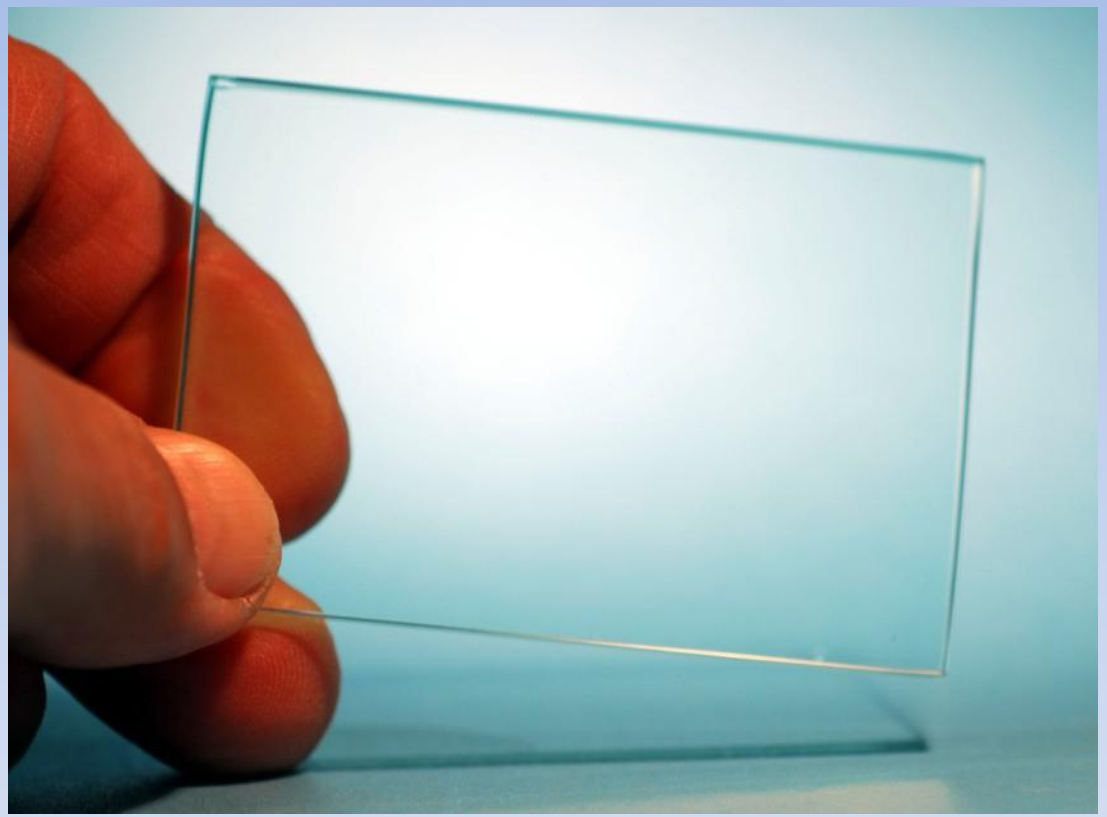
Back to the **unknown minerals** page.

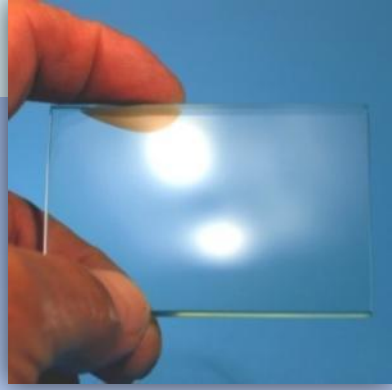
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 1

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #1

BACK TO THE ALPHABETICAL LIST OF MINERALS

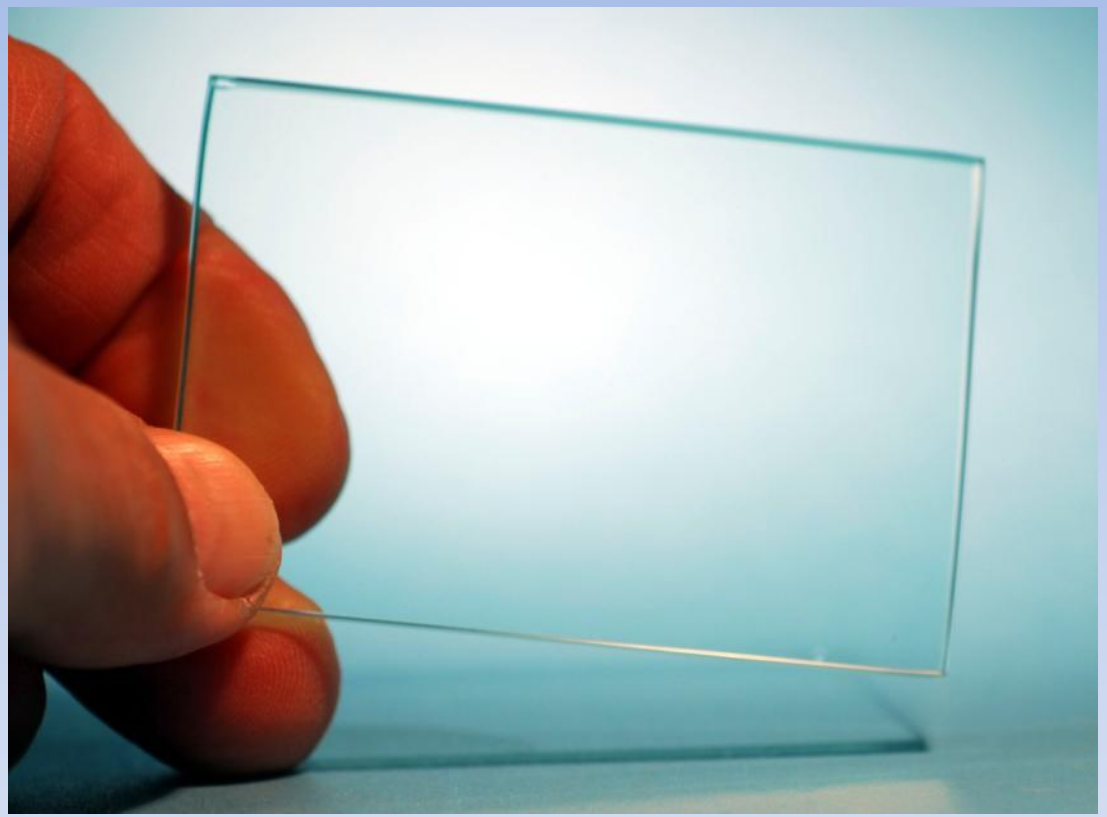
Back to the **unknown minerals** page.

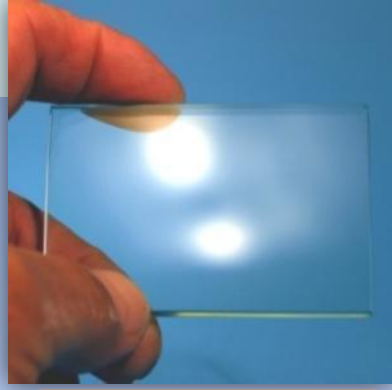
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 2

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #2

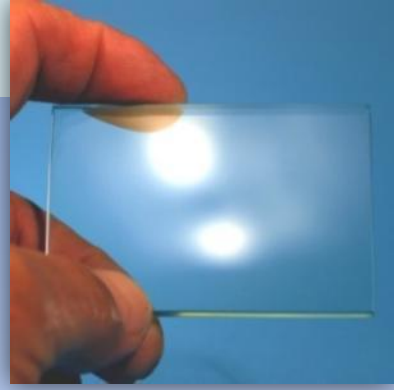
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

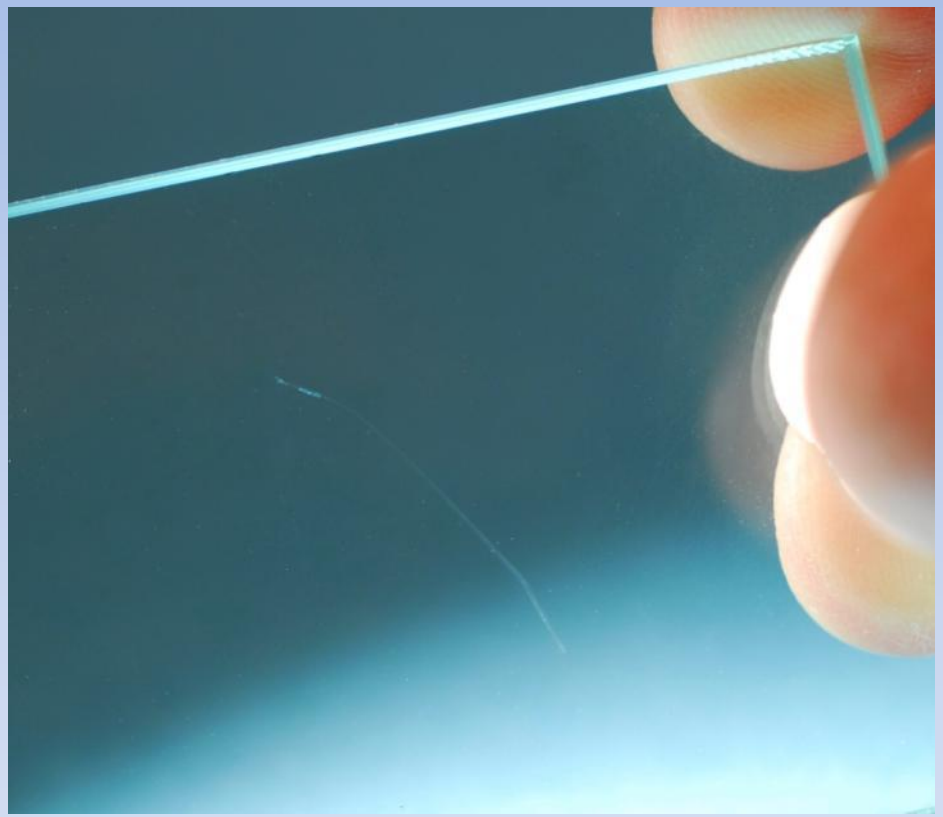
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 3



This test simply shows if the mineral scratches glass or not.



BACK TO UNKNOWN #3

BACK TO THE ALPHABETICAL LIST OF MINERALS

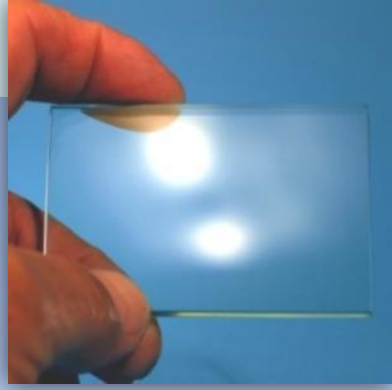
Back to the **unknown minerals** page.

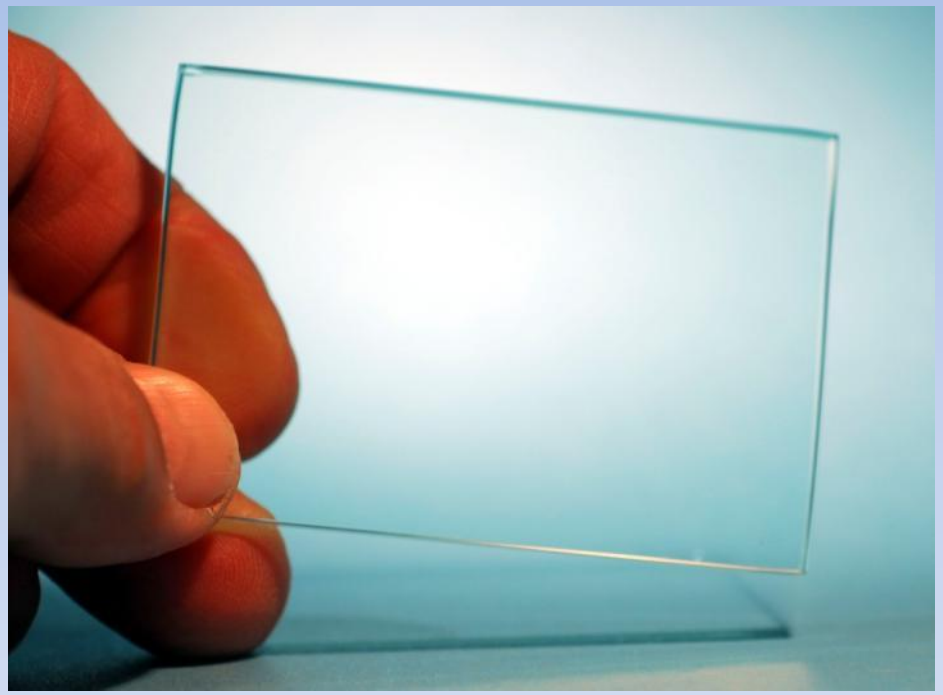
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 4

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #4

BACK TO THE ALPHABETICAL LIST OF MINERALS

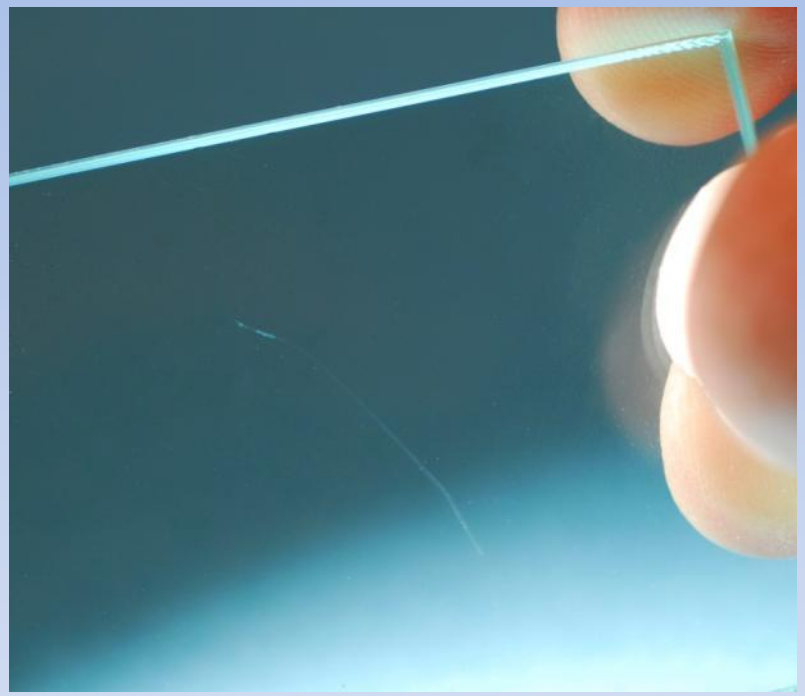
Back to the **unknown minerals** page.

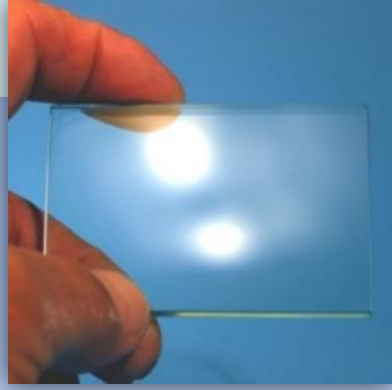
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 5

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #5

BACK TO THE ALPHABETICAL LIST OF MINERALS

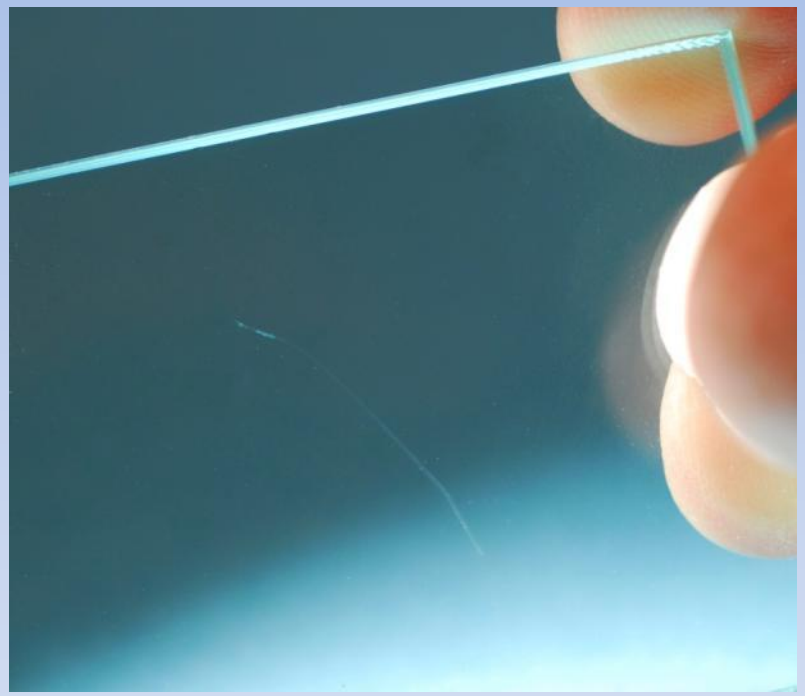
Back to the **unknown minerals** page.

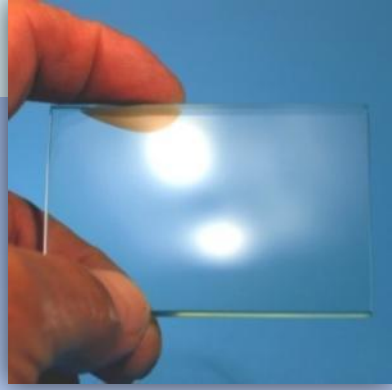
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 6

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #6

BACK TO THE ALPHABETICAL LIST OF MINERALS

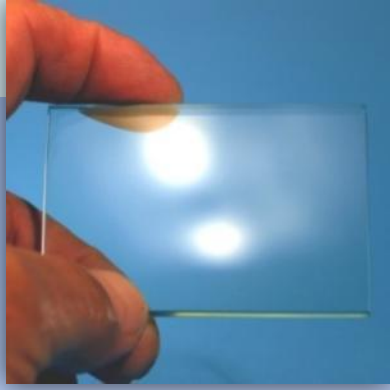
Back to the **unknown minerals** page.

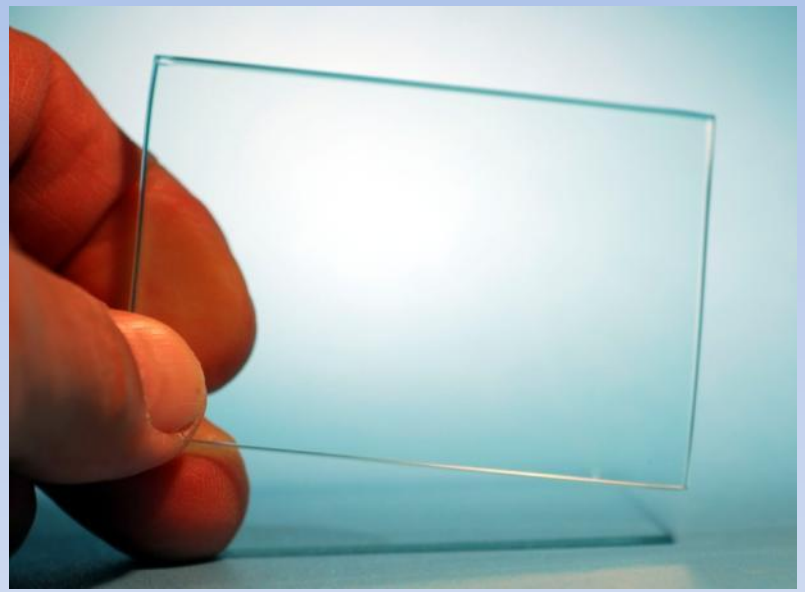
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 7

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #7

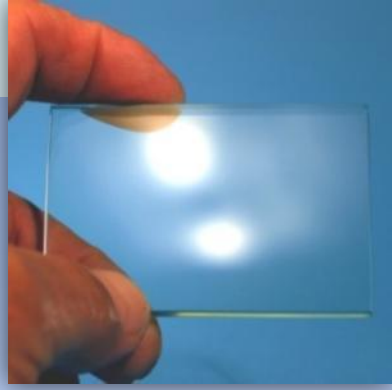
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

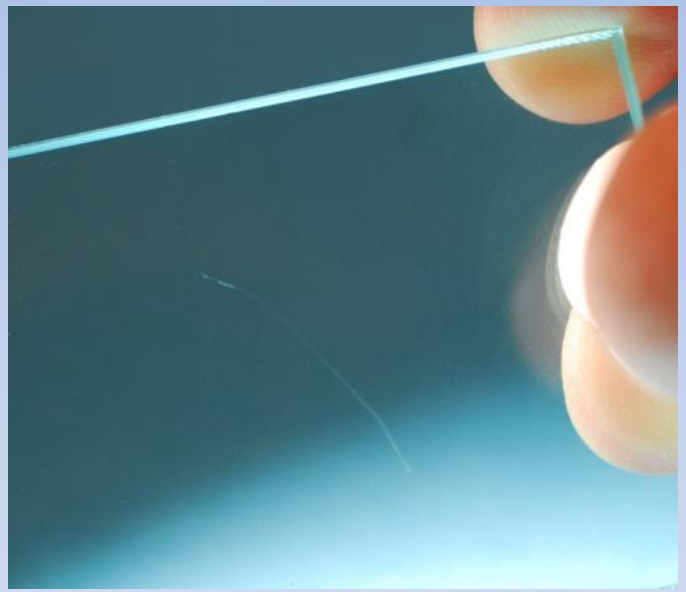
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 8



This test simply shows if the mineral scratches glass or not.



BACK TO UNKNOWN #8

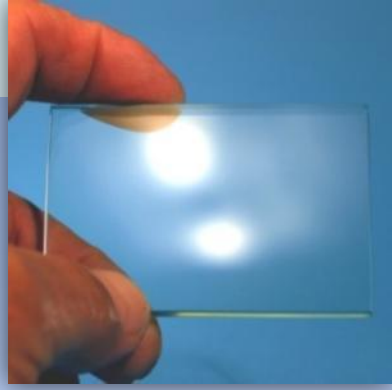
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

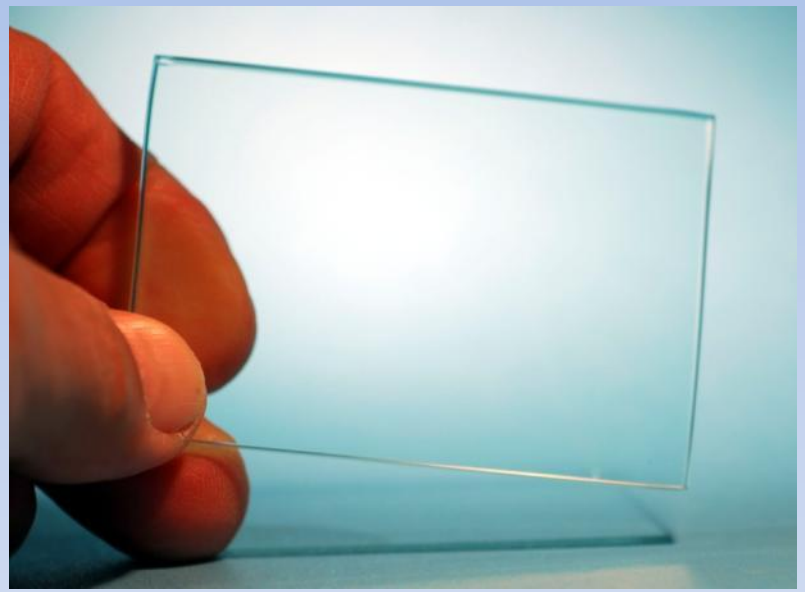
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 9



This test simply shows if the mineral scratches glass or not.



BACK TO UNKNOWN #9

BACK TO THE ALPHABETICAL LIST OF MINERALS

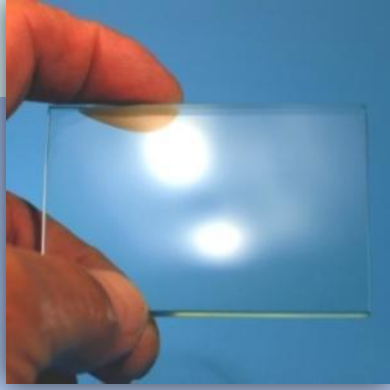
Back to the **unknown minerals** page.

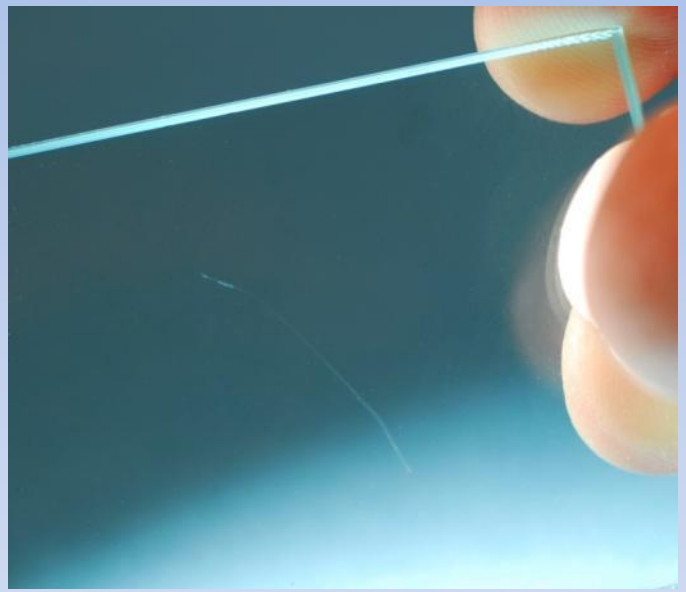
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 10

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #10

BACK TO THE ALPHABETICAL LIST OF MINERALS

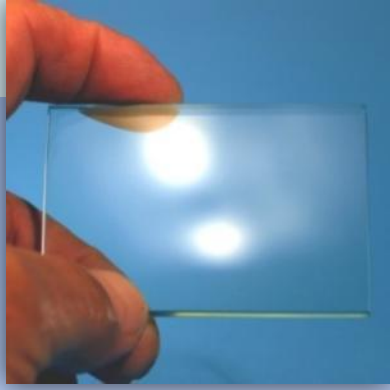
Back to the **unknown minerals** page.

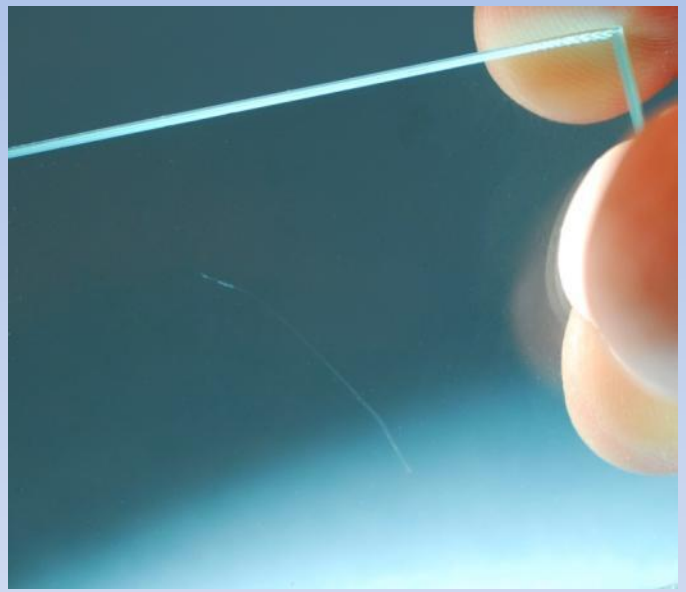
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 11

This test simply shows if the mineral scratches glass or not.





BACK TO UNKNOWN #11

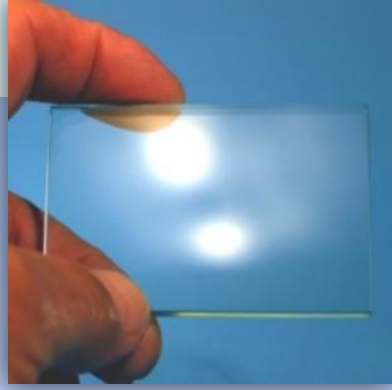
BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

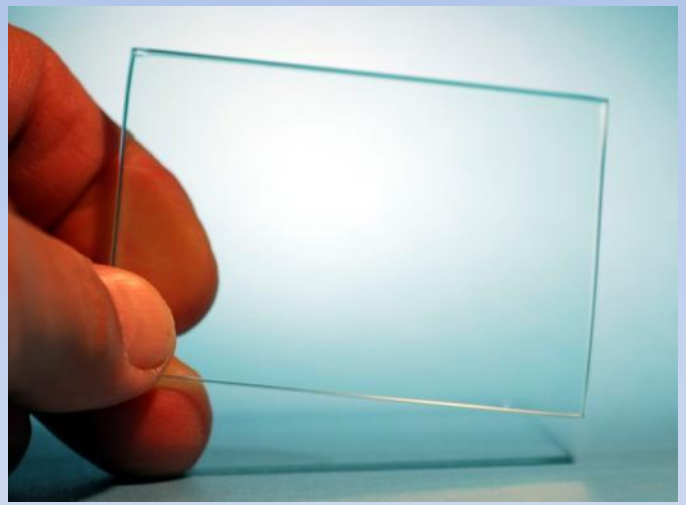
Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

GLASS HARDNESS TEST FOR MINERAL 12



This test simply shows if the mineral scratches glass or not.



BACK TO UNKNOWN #12

BACK TO THE ALPHABETICAL LIST OF MINERALS

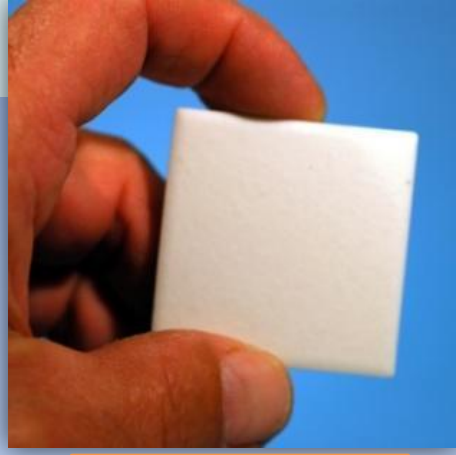
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 1**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #1

BACK TO THE ALPHABETICAL LIST OF MINERALS

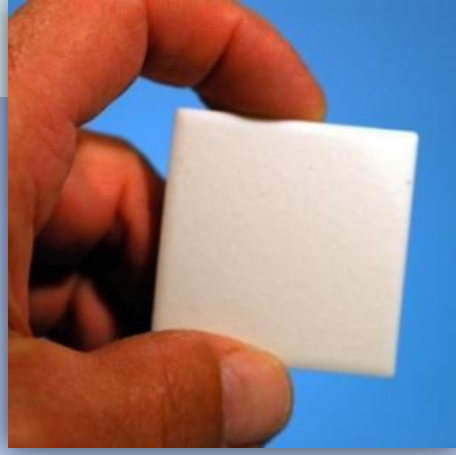
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 2**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #2

BACK TO THE ALPHABETICAL LIST OF MINERALS

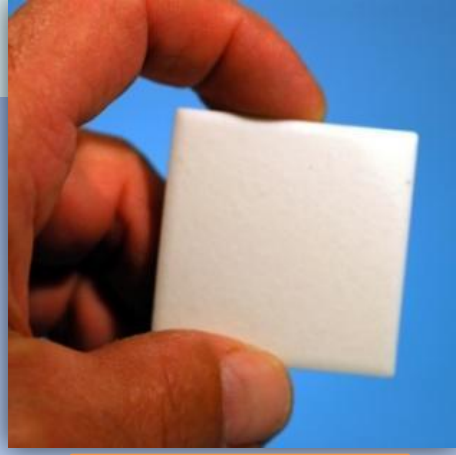
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 3**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #3

BACK TO THE ALPHABETICAL LIST OF MINERALS

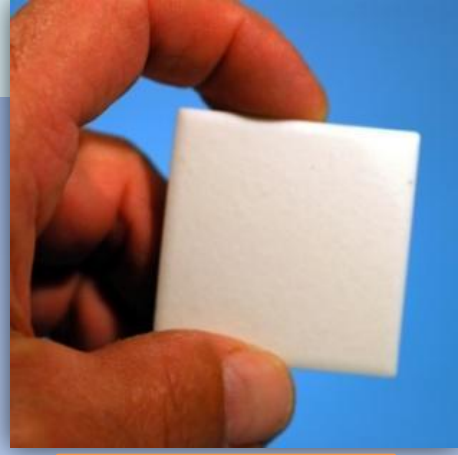
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 4**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #4

BACK TO THE ALPHABETICAL LIST OF MINERALS

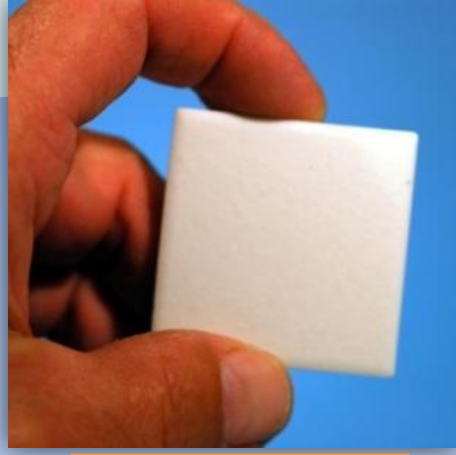
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 5**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #5

BACK TO THE ALPHABETICAL LIST OF MINERALS

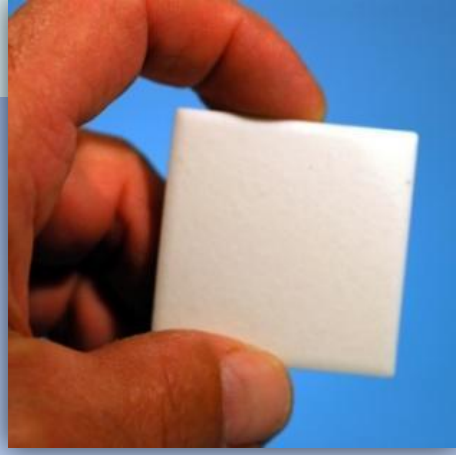
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 6**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #6

BACK TO THE ALPHABETICAL LIST OF MINERALS

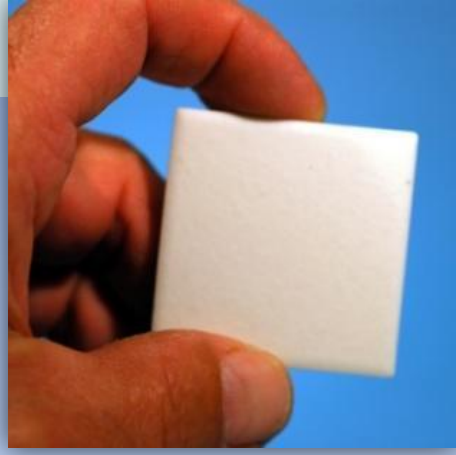
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 7**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #7

BACK TO THE ALPHABETICAL LIST OF MINERALS

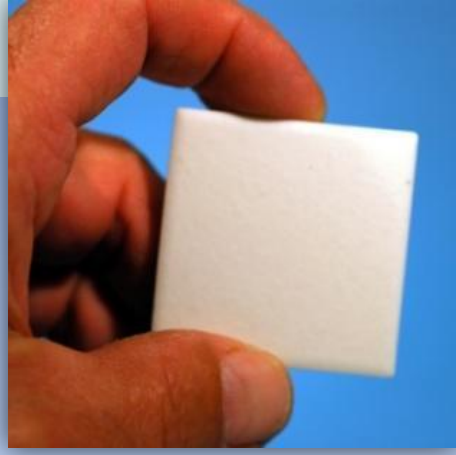
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 8**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #8

BACK TO THE ALPHABETICAL LIST OF MINERALS

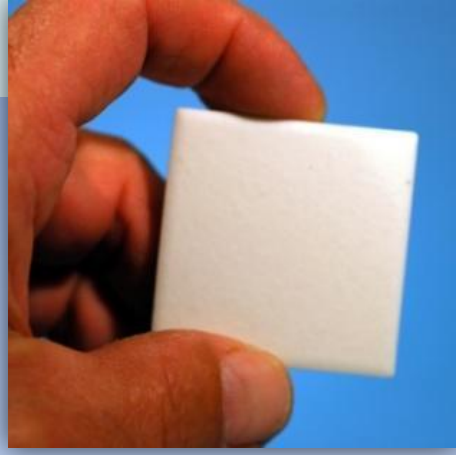
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 9**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #9

BACK TO THE ALPHABETICAL LIST OF MINERALS

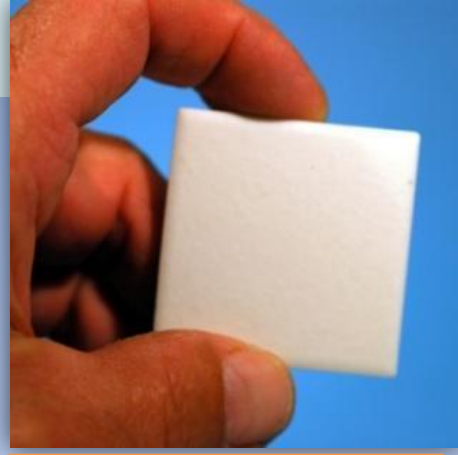
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 10**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.



BACK TO UNKNOWN #10

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 11**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.

BACK TO UNKNOWN #11

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

STREAK TEST FOR **MINERAL 12**

The streak is the color of the powdered mineral. A mineral that is about as hard or harder than the streak plate will not produce a streak.

BACK TO UNKNOWN #12

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 1

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.

BACK TO UNKNOWN #1

BACK TO THE ALPHABETICAL LIST OF MINERALS

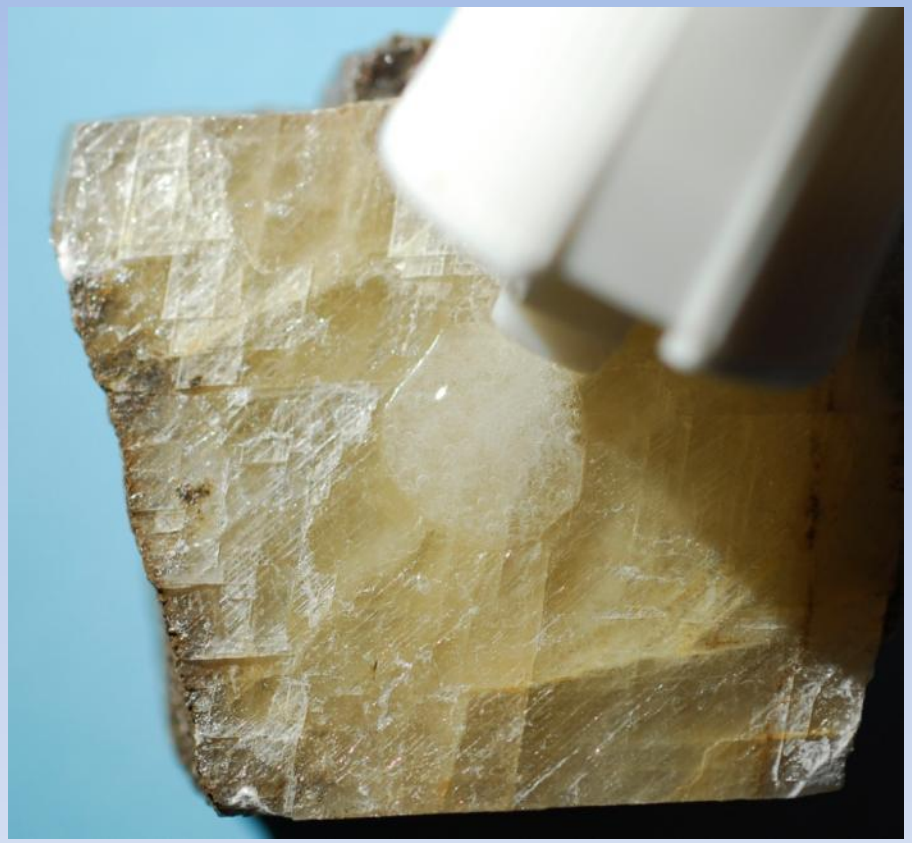
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 2

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.



BACK TO UNKNOWN #2

BACK TO THE ALPHABETICAL LIST OF MINERALS

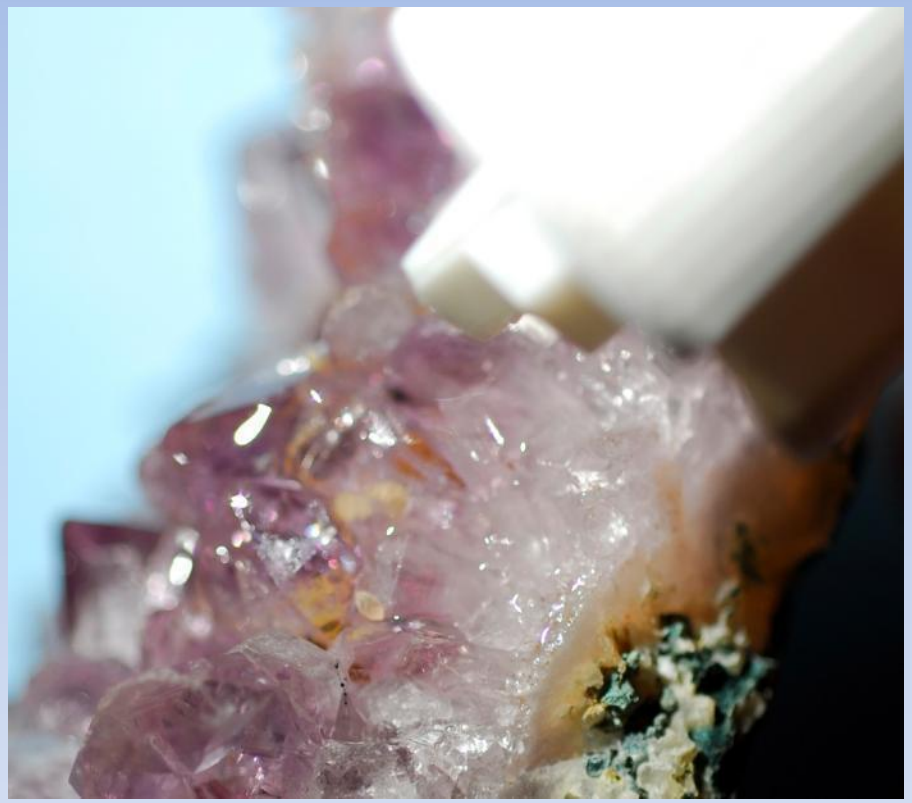
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 3

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.



BACK TO UNKNOWN #3

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 4

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.

BACK TO UNKNOWN #4

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 5

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.

BACK TO UNKNOWN #5

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 6

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.

BACK TO UNKNOWN #6

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 7

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.

BACK TO UNKNOWN #7

BACK TO THE ALPHABETICAL LIST OF MINERALS

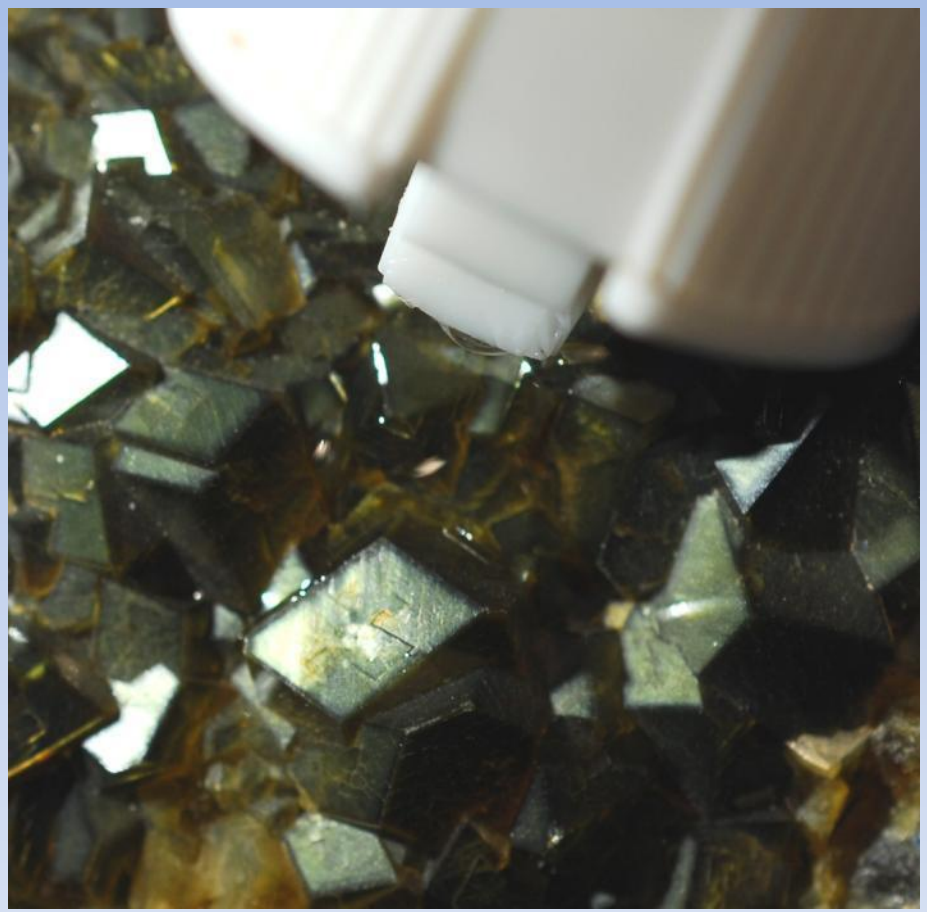
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 11

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.



BACK TO UNKNOWN #11

BACK TO THE ALPHABETICAL LIST OF MINERALS

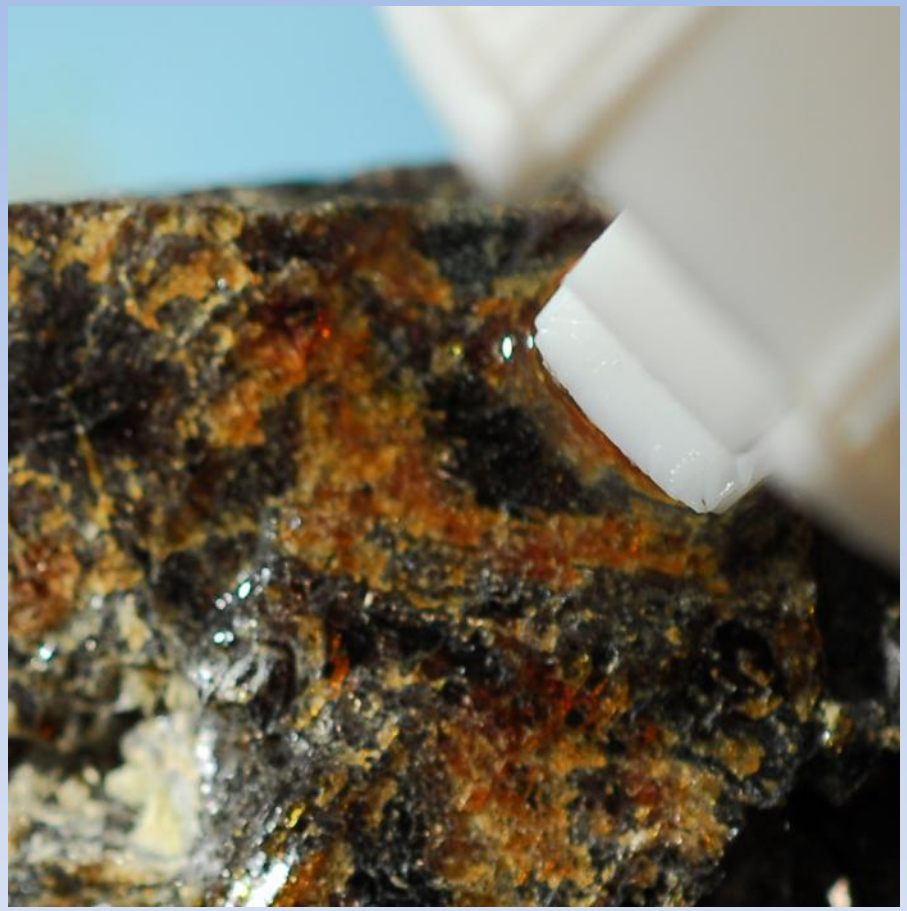
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HYDROCHLORIC ACID TEST FOR MINERAL 12

In this test a positive reaction for HCl is seen as bubbles in the drop that is on the mineral.



BACK TO UNKNOWN #12

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

ATTRACTION TO A MAGNET TEST FOR METALLIC MINERALS

MINERAL 8

If small fragments are attracted to a magnet the mineral is considered to be slightly magnetic. If large pieces are attracted it is considered magnetic.

BACK TO UNKNOWN #8

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

ATTRACTION TO A MAGNET TEST FOR METALLIC MINERALS

MINERAL 9

If small fragments are attracted to a magnet the mineral is considered to be slightly magnetic. If large pieces are attracted it is considered magnetic.

BACK TO UNKNOWN #9

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

ATTRACTION TO A MAGNET TEST FOR METALLIC MINERALS

MINERAL 10

If small fragments are attracted to a magnet the mineral is considered to be slightly magnetic. If large pieces are attracted it is considered magnetic.

BACK TO UNKNOWN #10

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 1

BACK TO UNKNOWN #1

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 2

BACK TO UNKNOWN #2

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

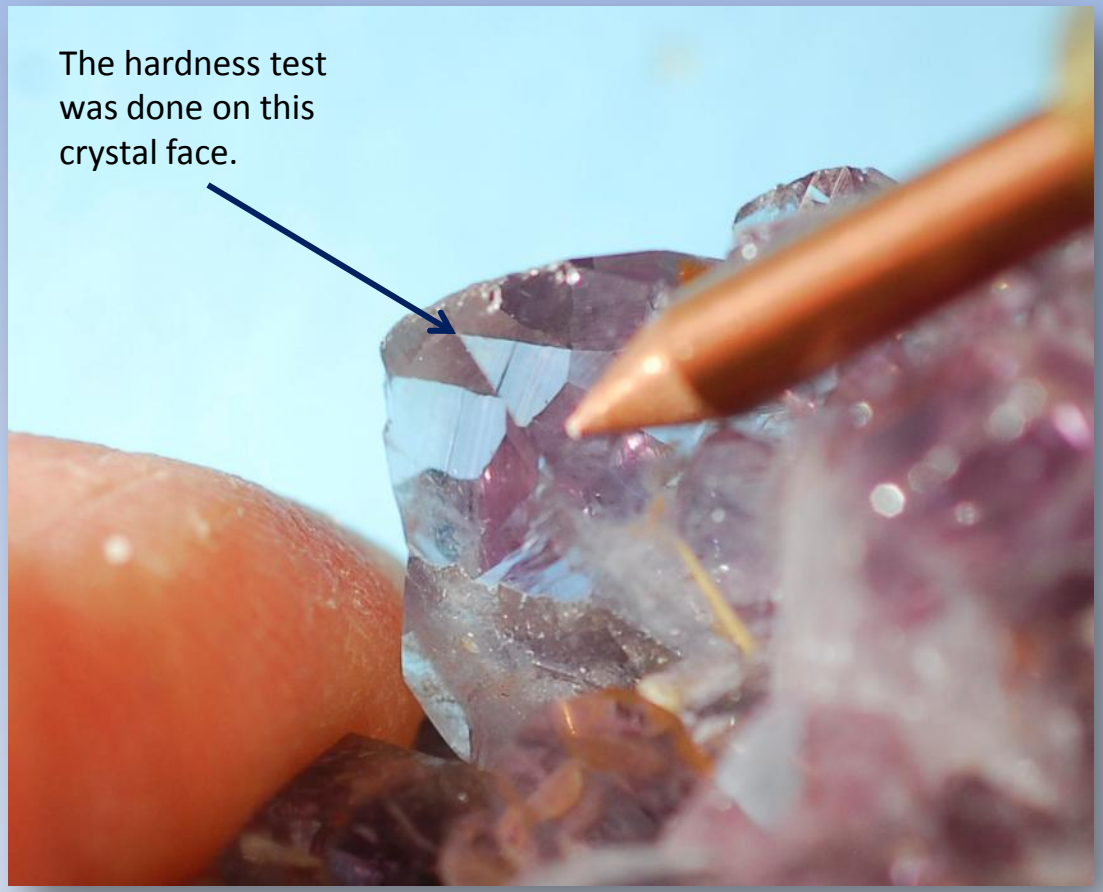
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 3



BACK TO UNKNOWN #3

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

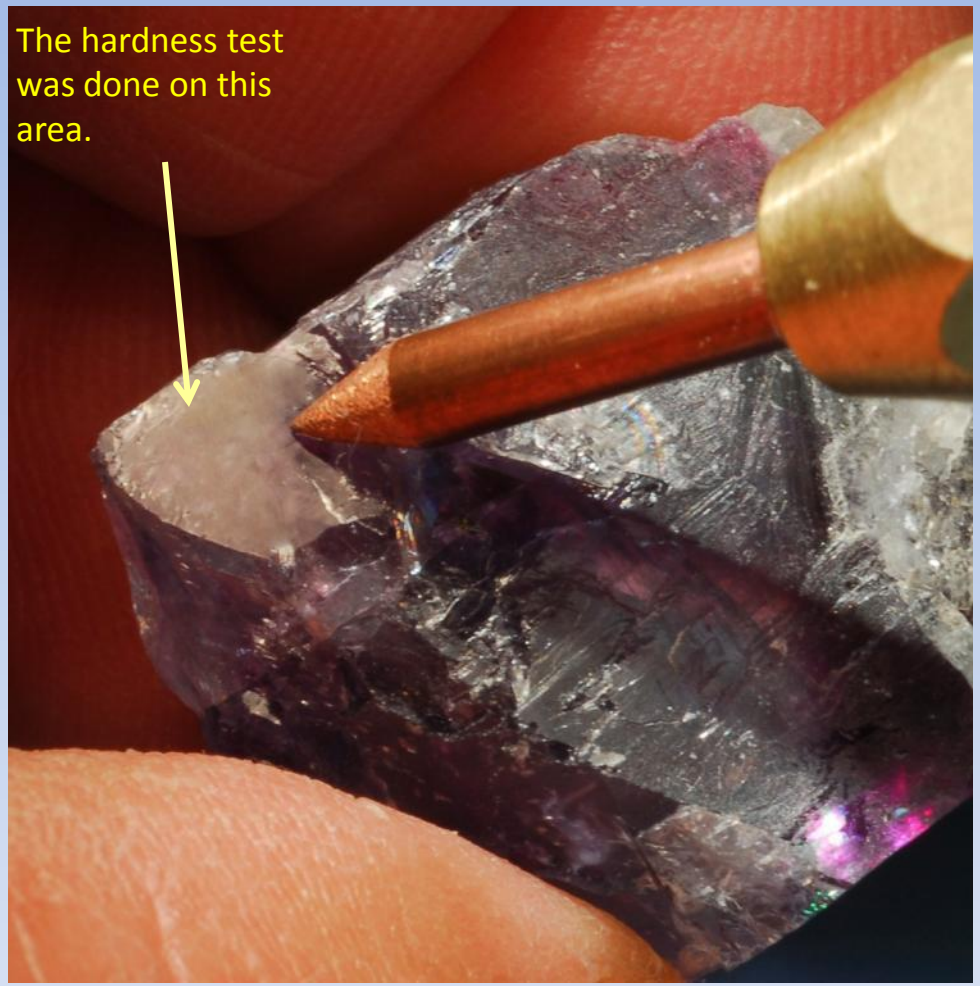
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 4



BACK TO UNKNOWN #4

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 5

BACK TO UNKNOWN #5

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 6

BACK TO UNKNOWN #6

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

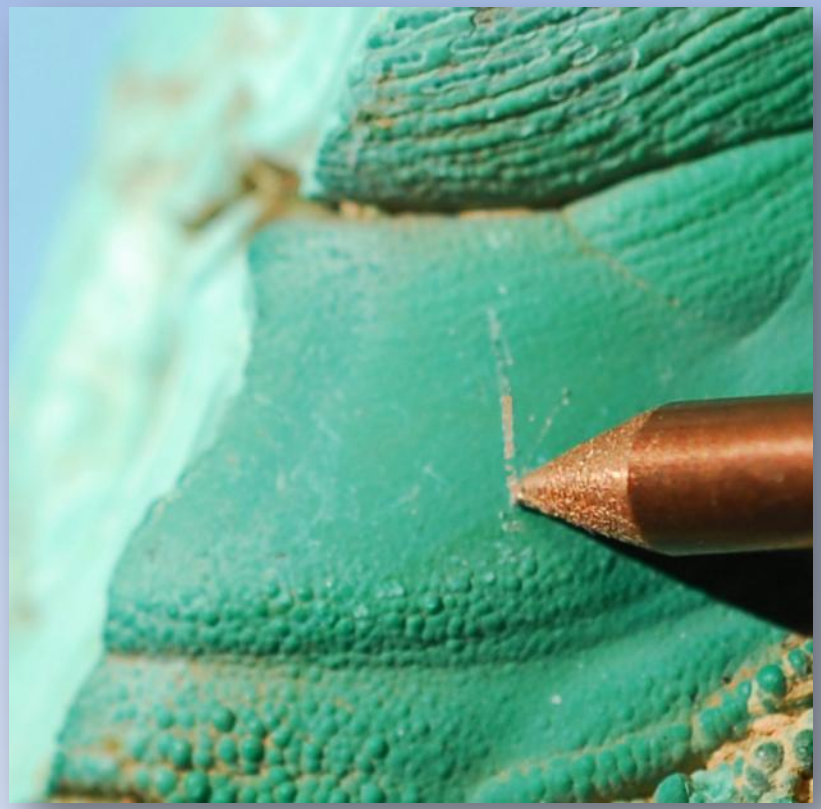
Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 7



BACK TO UNKNOWN #7

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 8

BACK TO UNKNOWN #8

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 9

BACK TO UNKNOWN #9

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 10

BACK TO UNKNOWN #10

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 11

BACK TO UNKNOWN #11

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

HARDNESS OF MINERAL COMPARED TO COPPER WIRE

MINERAL 12

BACK TO UNKNOWN #12

Copper has a hardness of 3 and the fine point of the wire allows for testing on small surfaces. The images are all close-up showing the results of this scratch test. Look for copper coming off onto the mineral if the mineral is harder than copper.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 1

BACK TO UNKNOWN #1

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage, look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 2

BACK TO UNKNOWN #2

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 3

BACK TO UNKNOWN #3

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 4

BACK TO UNKNOWN #4

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 5

BACK TO UNKNOWN #5

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 8

BACK TO UNKNOWN #8

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 9

This mineral did not break !
It flattened when struck with the hammer.

BACK TO UNKNOWN #9

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 10

BACK TO UNKNOWN #10

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1

BREAKABILITY – CLEAVAGE AND/OR FRACTURE

MINERAL 12

BACK TO UNKNOWN #12

The break test was done by striking each unknown mineral with a hammer.

If the mineral has cleavage look for flat surfaces. Some flat surfaces may be bright in reflected light.

BACK TO THE ALPHABETICAL LIST OF MINERALS

Back to the **unknown minerals** page.

Back to the EXPLANATON OF TOOLS PAGE

Back to Page 1