

HUI PŌHAKU 'O HAWAI'I

Rock & Mineral Society of Hawai'i, Inc.



VOLUME 45, NO. 8

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METALLIC MINERALS

BY DEAN SAKABE

This month's theme is "Metallic Minerals." I will not cover the big three metals: Gold, Silver and Copper. Instead I will try to note some of the other metallic minerals: Mercury, Covellite, Silicon, Aluminum, Cadmium, Titanium, Chromium, Iridium, Rhodium, and Palladium.

Mercury is extremely unique, being the only metal that is liquid at room temperature. It has a melting point of -40 C , and a boiling point of 357 C . This silvery liquid metal is very dense with a high surface tension which causes it to form tiny little spheres in the pores of the rocks it is found in. Mercury can be found in Almaden, Spain; California; Oregon; Texas; and Arkansas.

Covellite (1) is a copper sulfide not well known or widely distributed. However, its iridescent feature will captivate anyone that looks at the indigo blue. Covellite crystals are very rare, and are usually it is found in massive form. In Covellite, the copper ions are combined with three sulfur ions in flat triangular groups. In turn, these triangular groups lie in a plane between the tetragonal sheets. This structure gives Covellite a perfect cleavage into sheets, and this is why it is found in the flat faces and extreme softness (1.5 – 2 on the mohs scale). Covellite is found in Butte, Montana; Serbia; Germany; and Austria.

Silicon (2) is rarely found in nature in an uncombined form which is amazing when



(1) Covellite (Butte, Montana)

you consider that 25% of the Earth's crust has silicon in it. Silicon binds strongly with oxygen and is usually found as silicon dioxide (quartz) or as a Silicate (SiO_4). Native Silicon has been found in volcanic exhalations (emissions) and sometimes as tiny inclusions in gold. Silicon can be found in rock shops as end fragments of silicon boules, discarded by the integrated circuit industry. The unused parts of the boules are often saved, and used as decorative items.



(2) Ferro Silicon (Tian Jin, China)

MEETING

Wednesday

August 24

6:15-8:00 pm

Makiki District

Park

Administration

Building

NEXT MONTH

Wednesday

September 22

LAPIDARY

Every Thursday

6:30-8:30pm

Second-floor Arts

and Crafts Bldg

Makiki District

Park

MEMBERSHIP

COSTS

2008

Single: \$10.00

Family: \$15.00

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2010 ROCK SHOW OCTOBER 16 & 17 10AM-7PM AT OUTRIGGER WAIKIKI HOTEL

Aluminum rarely occurs naturally in its elemental form, even though only oxygen and silicon are more abundant in the earth's crust. Native Aluminum has been found in volcanic muds, as tiny grains along with other elemental metals. Pure Aluminum is very soft and weak, however when alloyed with other metals such as copper, magnesium or manganese its mechanical properties can improve greatly, making Aluminum relatively strong (per unit of weight). That strength, when combined with its low cost makes it a popular metal for building anything which can be extruded. Aluminum is extremely reactive, and any bare surface instantly grows a microscopic oxide layer (Corundum) that is air tight and prevents further oxidation. A mixture called Thermite is powdered aluminum and iron oxide, and when ignited, the aluminum steals the oxygen from the rust. This generates a great deal of heat and leaving molten iron. Powdered aluminum is also a primary ingredient in slow explosives such as fireworks. One of the more notable uses of Aluminum occurred in 1884. Aluminum at that time was incredibly valuable, and important enough to be used as a capstone for the Washington Monument. To complete the obelisk, the aluminum capstone weighing 100 ounces, the largest single piece of aluminum cast to that time, was placed atop the monument on Saturday, December 6, 1884.

Cadmium (3) was discovered by Fredrich Stromeyer in 1817 as an impurity in zinc carbonate. He observed that some impure samples of calamine changed color when heated, but pure calamine did not. The element name comes from the Latin word 'cadmia', meaning calamine. Almost all cadmium is obtained as a by-product of zinc, copper, and lead ore refining operations. Cadmium is a soft, malleable, ductile, bluish-white metal, which is easily cut with a knife. It is an excellent electrical conductor and shows good resistance to corrosion and attack by chemicals. Most cadmium is used in batteries (NiCad). Cadmium is also used in low melting alloys and as such is a component of many kinds of solder. Compounds containing cadmium are used in the blue and green phosphors for color television picture tubes. Cadmium sulfide is used as a yellow pigment, and cadmium selenide is used as a red pigment.

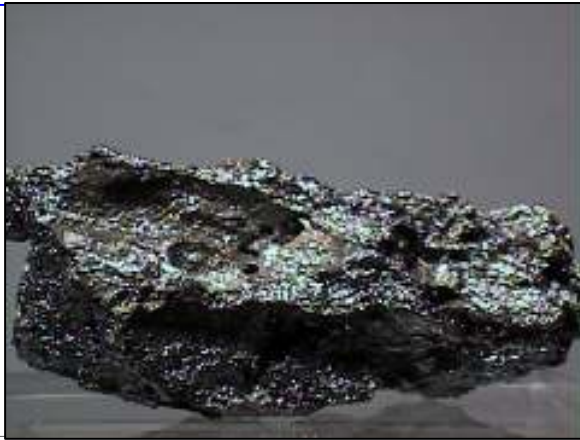


(3) Cadmium

Titanium (4) was discovered by English clergyman William Gregor who was studying a mineral found near his home. He was able to identify most of the mineral, but he found one part that he could not identify. He decided it was a new substance, but did not continue his research. Instead, he wrote a report and left it to professional chemists to find out more about the material. That mineral was Ilmenite, and is made of iron, oxygen and Titanium. Four years later, German chemist Martin Heinrich Klaproth decided to study Ilmenite and believed that Gregor had been correct and that Ilmenite truly did contain a new element. Klaproth suggested the name Titanium, in honor of the Titans. The most important use of titanium is in making alloys. Steel is the most common metal used, as it adds strength to the steel and makes it more resistant to corrosion. Titanium is also half as dense as steel, therefore a steel alloy containing titanium weighs less, pound-for-pound, than does the pure steel alloy. Titanium alloys are used in the airframes and engines of aircraft and spacecraft. Additionally it is used in armored vehicles, armored vests, helmets, in jewelry, eyeglasses, bicycles, golf clubs, and other sports equipment. Titanium alloys are also biocompatible, in that it does not cause a reaction when placed into the body. Therefore they are also being used

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(4) Titanium (smelted in Russia)

Chromium (5) was discovered in 1797 by French chemist Louis-Nicolas Vauquelin. The name Chromium comes from the Greek word "Chroma", meaning "color," because chromium compounds are many different colors. Most of the chromium produced today is used in alloys, such as stainless steel. Chromium is also used to cover the surface of other metals. This protects the base metal and gives the surface a bright, shiny appearance.



(5) Chromite

Iridium is a metal of the Platinum family, and it is whitish with a slight yellow tinge. It was the most corrosion-resistant metal known, and was used in making the standard meter bar of Paris, which is a 90 percent platinum and 10 percent iridium alloy. This meter bar was replaced in 1960 as a fundamental unit of length. Iridium occurs uncombined in nature with platinum and other metals in alluvial deposits. However it is mostly recovered as a by-product from the nickel mining industry. Iridium is alloyed with Osmium for use in pen nibs and compass bearings.

ings.

Rhodium occurs natively with other platinum metals in river sands of the Urals and in North and South America. However, Rhodium is produced as a byproduct of processing Nickel. Rhodium is silvery white, with a higher melting point than Platinum. Plated Rhodium, produced by electroplating or evaporation, is exceptionally hard and is used for optical instruments. Rhodium is also used for jewelry, for decoration, and as a catalyst.

Palladium was discovered in 1803 by Wollaston, Palladium is found with platinum in alluvial deposits of Russia, South America, North America, Ethiopia, and Australia. As with other metals of the Platinum group, it is mainly produced as a byproduct of the Nickel mining industry. Palladium is a steel-white metal, it does not tarnish in air, it is the least dense, and has the lowest melting point of the platinum group of metals. At room temperatures, the metal has the unusual property of absorbing up to 900 times its own volume of hydrogen, possibly forming Pd₂H. Hydrogen readily diffuses through heated palladium, providing a means of purifying the gas. White gold is an alloy of gold decolorized by the addition of palladium.

XMAS PREVIEW

MAHALO RUSSEL K FOR DONATING THIS BEAUTIFUL GEMSTONE GLOBE FOR OUR CHRISTMAS AUCTION!



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DOOR PRIZES

Please note that we have instituted door prize drawings at our monthly meetings. Because of Hawai'i's gambling laws, these drawings cannot be conducted in the common "raffle" format where tickets are sold. Rather, each *paid* member attending the meeting will receive a drawing ticket upon request. A voluntary donation of \$1.00 is requested and encouraged. Drawings will be conducted at the end of the meeting with available prizes awarded in random order. You must be present to win. Please remember: if you win a prize, please bring one to the next meeting. This helps to keep our drawings going. Thank you.

WE HAVE A WEBSITE!

http://pohakugalore.net/Hui_pohaku/Hiu_pohaku_1.html

MAHALO TO MARKUS FOR HELPING US GET OUT OF THE ELECTRONIC STONE AGE!

THE METAPHYSICAL PROPERTIES OF METALLIC MINERALS BY JADE EMORY

Metaphysically, gold relates to the Sun in one's astrological birth chart, and silver relates to the Moon in one's birth chart. Platinum relates to the soul and the Ascendant in one's birth chart. All these metals have notable "medicine" powers. People who wear gold are enhancing their male side and people who wear silver are enhancing their female side, regardless of their physical gender.

The first peoples of many lands identified the Creator as the Sun God, which provides warmth, light and crops. Hence religious objects were often made out of gold. In many cultures brides prefer gold for their wedding bands. Columbia, South America developed a refined form of platinum 1500 years before Europeans discovered one. The Spanish conquistadores did not appreciate platinum the way they did gold. Unfortunately, they desecrated the gorgeous religious objects of the South American Native cultures and melted down the gold.

A notable difference is in Japan, where the overwhelming majority of brides prefer platinum. Platinum dates back 3000 years, beginning in Egypt as far as we know. Archeologists found Egyptian gold pieces which contained traces of platinum. Even more thrilling was that they uncovered a box dating to the 7th century B.C. made of gold and silver, balancing yang and yin, which also had a panel made of platinum. Ancient Egypt surely was an evolved culture. European scientists finally became attentive to platinum in the mid 1700s, because its high melting point made progress difficult. Yet any sensitive person wearing platinum can instantly feel the high vibration of platinum compared to gold or silver.

Rock & Mineral Society of Hawai'i, Inc.

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The Rock & Mineral Society meets on the 4th Wednesday of each month (except for adjusted dates in November and December) at the Makiki District Park, 7:00 - 9:00 pm. Enter from Keeaumoku Street. Parking is free but limited.

The Newsletter is published monthly, some days prior to the meetings and is distributed in electronic format by email (Adobe Acrobat PDF file attachment). Printed copies are "snail" mailed to those who do not have email. The electronic format usually contains full-color images; the print version may be limited to B&W due to reproduction costs.

Any newsletter comments are appreciated, and can be sent to elise.thomasson@gmail.com

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