

# HUI PŌHAKU 'Ō HAWAII

## Rock & Mineral Society of Hawai'i, Inc.



### Meeting Times

#### MEETING

Wednesday  
January 25, 2017

6:15-8:00 pm

Makiki District Park  
Admin Building

#### NEXT MONTH

Minerals from  
Maagascar

#### LAPIDARY

Every Thursday

6:30-8:30pm

Makiki District Park  
2nd floor Arts and  
Crafts Bldg

#### MEMBERSHIP

DUE COSTS 2015

Single: \$10.00

Family: \$15.00

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### Apatite and Spinel By Dean Sakabe

We start the New Year with Apatite's and Spinel's.

Apatite is a calcium-phosphate mineral. The name Apatite comes from the Greek "apate" which means deceit, it apply describes Apatite, because it comes in several different forms. Apatite also comes in many different colors mostly green or yellow but also white, red, pink, purple, brown or blue. Additionally Apatite can be colorless or multi-colored. Apatite has a hardness of 5, similar to glass. The cleavage of Apatite is uneven and it can be brittle.



Apatite on Albite, Linopolis, Minas Geras, Brazil

*Interesting fact:* The bones and teeth of most animals, including humans, are composed of calcium phosphate, which is the same material as apatite.



Apatite, Minas Geras, Brazil

Three of the more common forms of Apatite are Fluorapatite ( $\text{Ca}_5(\text{PO}_4)_3\text{F}$ ), Chlorapatite ( $\text{Ca}_5(\text{PO}_4)_3\text{Cl}$ ), and Hydroxyl apatite ( $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ ).

Hydroxylapatite consist of apatite calcium and phosphate bonded with hydroxide. Hydroxyl Apatite composes 70% of bone material in the human body additionally it is the main mineral that tooth enamel and dentin. The organic portion of bone has collagen which is a connective tissue. The inorganic portion of bone is composed of hydroxylapatite

## Apatite and Spinel

or in some cases it is called hydroxyapatite. Coral skeletons can actually be heated at high temperatures to create hydroxylapatite. The high temperatures will burn proteins, and prevents (GVHD). (GVHD) or graft versus host disease is a common disease that may take place during bone marrow transplants. The individual's immune system receiving the transplant will defend itself. Their antibodies will view the bone marrow as an invader even though it may be the same exact bone type.



Turquoise pseudomorph of Apatite with Muscovite, Mina la Caridad, Nacozari Garcia, Mexico

Fluorapatite is a naturally occurring calcium phosphate, it is also the most common form of apatite. Just like Hydroxylapatite this material also makes up the enamel in teeth and helps in protection against tooth decay.

Chlorapatite consists of calcium, phosphate and Chlorine. Chlorapatite will normally come in white, yellow, and a light pinkish color.

Apatite is the most common phosphate mineral, and is the main source of the phosphorus required by plants. The bones and teeth of most animals, including humans, are composed of calcium phosphate, which is the same material as Apatite.

(These biological Apatites are almost exclusively the Hydroxylapatite type.)

Discovered in 1860, this mineral is named from the Greek word "to deceive" as it was often confused with other minerals. It is widely disseminated as an accessory constituent in all classes of rocks: igneous, sedimentary, and metamorphic. Fluorapatite is by far the most common species of this mineral group.

Apatite is identified by the chemical formula  $Ca_5(PO_4)_3$ . It forms in hexagonal crystals and is a rock phosphate mineral. Apatite can exist in many different forms, along with other minerals, as long as the base of apatite calcium ( $Ca_5$ ) and phosphorous ( $PO_4$ ) exist together. There are three common forms of apatite that appear in nature. The three apatites are distinguished by the ions in their crystal lattice. It is important to note that all three varieties are usually present in every specimen although some specimens may have close to 100% of one ion or another. There are many more, but these are the most common three.

Spinel is a magnesium aluminum oxide ( $MgAl_2O_4$ ). Where the Magnesium may be replaced by iron, zinc, or manganese. The hardness and varying colors of gem quality spinel set it apart from other gem materials. The possible color ranges are red to pink, violet red, pale lilac, violet blue, blue, or



Fluorapatite on Albite, SapoMine, Minas Gerais, Brazil

## Apatite and Spinel

black. Which happens to be a similar color range of Corundum. Spinel form by regional metamorphism or contact metamorphism in limestones, and in schists, it is also found in pegmatitic environments. This is also where corundum can be found. So in some alluvial deposits where rolled pebbles of spinel, corundum may also be found.

The varieties of spinel are: Red spinel - This spinel may be an intense, bright red (similar to Ruby's), however it is usually more softer in tone than red, such as in pink-red, brick red, or almost orange, it may also have a violet tinge. These stones are sometimes referred to as Balas ruby, after the Badakshan (Balascia) region of Afghanistan where they were found. Red and pink spinels come from the Mogok region of Burma, Afghanistan. In Sri Lanka and Thailand, they are found together with

corundum. Here the aluminum oxide in the surrounding rocks has

either formed into the corundum mineral, or it combined with magnesium to form spinel.

Blue spinel - The blue variety was not as known and appreciated than the red variety. The finest specimens have a bright blue color comparable to some sapphires and are very attractive, lustrous, and transparent. Fine blue spinels are hard to distinguish at first sight from sapphires of a similar color. A difference in pleochroism is not always a sure distinction, as there are spinels that have clearer pleochroism. But there is a marked variation in density. Blue spinel is mainly found



*The Timur Ruby*  
The Timur Ruby is a 352.5 carat red spinel, in a Necklace of the Royal Collection, made for Queen Victoria in 1853. Stone was found in Afganistan, and was part of the Lahore Treasure presented to Queen Victoria

in the gem gravels of Sri Lanka and recently in Tanzania,

A bit of unintentional confusion has been created by the accustomed name of "ruby spinel." Some of the largest and most famous "rubies" in the world, such as the 361carat "Timur ruby" and the "Black Prince's Ruby" in the English crown jewels have turned out to be Spinel. Both are uncut and only polished. The drop-shaped spinels in Bavaria's Wittelsbach crown of 1830 were also originally



170-carat bright red spinel named "The Black Prince's Ruby." First known owner was Abu Sa'id, 14<sup>th</sup> century Moorish Prince of Granada. The stone thought of as a large Ruby passed through several owners, eventually into the Imperial State Crown of the United Kingdom. It is mounted immediately above the famous Cullinan II diamond



Spinel, Pien-Pyit, Mogok, Burma

WE HAVE A FACEBOOK PAGE! LET'S GO LIKE IT!

HTTP://WWW.FACEBOOK.COM/PAGES/ROCK-AND-MINERAL-SOCIETY-OF-HAWAII/103902329673700?v=WALL&REF=SGM  
 MAHALO TO MARKUS FOR ESTABLISHING OUR *ROCK FACE!*

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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, 6:15-8 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.

**DOOR PRIZES**

Please note that we have instituted door prize drawings at our monthly meetings. Because of Hawaii'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.

thought to be rubies.

Today, expensive rubies are substituted by spinels. Not to commit fraud but to prevent one. A Spinel may take the place of a ruby that would have been displayed in public by an owner who is insecure about the rubies safety. It is a little better to lose a \$100,000 dollar spinel than a \$1 million dollar ruby.



Spinel, Pyin-Oo-Lwin, Mandalay, Burma

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