HUI PŌHAKU 'O HAWAI'I
Rock & Mineral Society of Hawai'i, Inc.

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PLEOCHRONIC MINERALS

BY DEAN SAKABE

Pleochroic minerals are minerals that show different colors depending on what direction you are observing the crystal. In order to view pleochroism you need an individual transparent crystal. This effect can be very dramatic. Many minerals are technically pleochroic, but most often the color change is so small that it can be barely detected. For those few other minerals, the color change is very, very obvious. The greatest change is limited to three colors and is called *trichroic*(1-3). A two color change occurrence is called *dichroic* (4-5). Pleochroic, which means "*many colors*", is used to cover both of these color changes. Most of the time, the color change is limited to shade changes such as from pale pink to dark pink.

1-3 Tanzanite with all 3 colors of the natural trichroic crystal present and strongly showing down different axes of view

MEETING
Wednesday
July 28
7:00—9:00 pm
Makiki District Park
Administration Building

NEXT MONTH
Wednesday
August 25, 2010

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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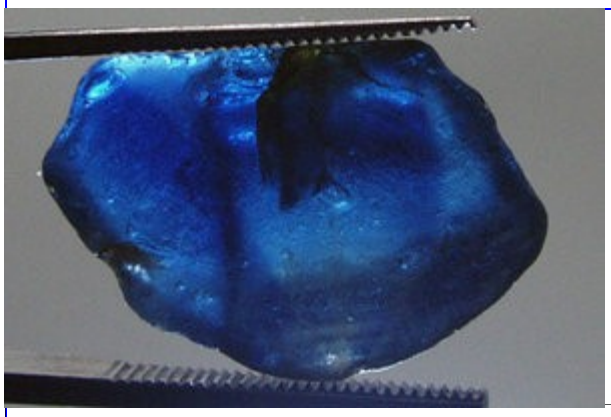
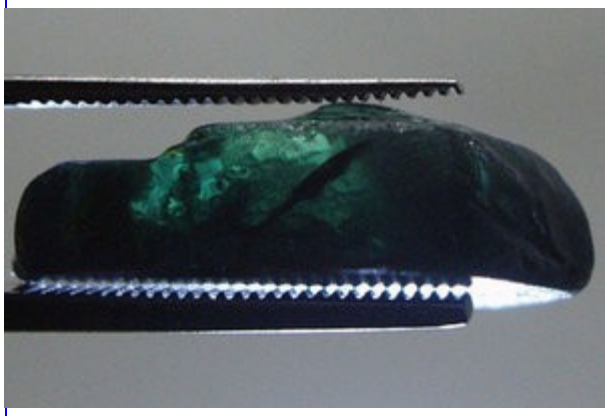


4 Sapphire: Top View



5 Sapphire: Side View

Pleochroism is caused by the absorption of different wavelengths of light travelling through different directions in the crystal. For instance, if in one direction, all wavelengths but yellow and blue are absorbed then the crystal will be green. If viewing in the other direction, all wavelengths are absorbed but yellow, so then the crystal will appear yellow. Therefore, turning this crystal from the first direction to the other will change the color from green to yellow.

This takes us to crystal structures. Isometric minerals cannot be Pleochroic since this mineral has the same structure, and thus the same light absorbing capabilities in all directions. Tetragonal, trigonal, and hexagonal minerals can only be dichroic since they have one unique structural direction along the major symmetry axis and only one direction in every other direction. This leaves only orthorhombic, monoclinic, and triclinic minerals that can be trichroic. This is because they have three unique axes of symmetry and therefore three unique directions that can absorb light in three different ways.

The most famous dichroic mineral is Cordierite, a Magnesium Aluminum Silicate. The gemstone variety of cordierite is called Iolite. Its unusual blue-violet color is comparable to a light blue sapphire with a purplish tint. This color is the reason that Cordeirite is sometimes called *"water sapphire."* One of the most notable characteristics of cordierite is its strong pleochroism, or color changing ability. This bluish-purple mineral turns gray when the crystal is rotated or viewed from a different angle.

Zoisite, a Calcium Aluminum Silicate Hydroxide, has a structurally complex mineral having both single silicate tetrahedrons and double silicate tetrahedrons. In 1967, a blue gemstone variety of Zoisite was found in Tanzania. It was later named Tanzanite, because the blue-lavender color was unique and set it apart from all other gemstones. Pleochroism is very pronounced in tanzanite and is seen as three different color shades in the same stone. In the viewing of a tanzanite stone from different angles, the colors dark-blue, green-yellow and red-purple can all be seen as a result of the pleochroism. Lesser stones may have a brownish color due to the mixing of blue, purple and green. These stones are usually heat treated to a deep blue color.

Kunzite, a Lithium Aluminum Silicate is the pink to light purple gem variety of Spodumene. Spodumene is a common mineral, however it occurs in transparent gem form in only a few select localities. The Pink form is Kunzite and the green form is Hiddenite. Kunzite was first found in Pala, California, in 1902 and named after gemologist George F. Kunz. Kunzite also has the notorious habit of color fading in strong light. Some deep pink stones have turned nearly colorless from fading. Sometimes the color of Kunzite can be restored (or intensified) by irradiation. Kunzite also has strong pleochroism, showing lighter and more intense coloring when viewed at different angles.

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Andalusite (5-6), a Aluminum Silicate, is named after the locality it was found: Andalusia, Spain. A unique variety of andalusite is called "*chiastolite*". It contains black or brown clay and/or carbonaceous material (often graphite) inclusions in the crystal. These inclusions are arranged in regular symmetrical shapes - especially prized are when they form a cross or an X. Andalusite was sometimes called "poor man's Alexandrite" in the past, because of its distinct color display. The pleochroic effect exhibiting different colors in different directions when viewed in crossed polarizers. The effect in is that it may show red in one direction and green in another.

6-7 Andalusite
Xisha Mine, Henan, China

Elbaite, a Sodium Lithium Aluminum Boro-Silicate Hydroxide, belongs to the group of minerals known as the Tourmalines. The many varied colors of Elbaite make it arguably the most colorful of the precious stones. Elbaite contains many variety names based on color. The blue variety is called Indicolite, the pink to red variety is called Rubellite, the green variety is known as Verdelite, while the most famous variety is a pink and green combination called Watermelon Tourmaline. Often a specimen can have more than one color zone in the same crystal. These zones can alternate in color from the inside to the outside or from the top to bottom. Elbaite is also strongly pleochroic which means that a transparent crystal will appear darker when viewed down the long axis of the crystal. A green or blue Elbaite can appear black when viewed from such an angle.

The Metaphysical Properties of Round Minerals
By Jade Emory

The exciting thing about di-, tri- and polychroic gems is their ability to change their colors in different lights. It is like wearing a new face at different times, without plastic surgery.

We actually do have at least 4 faces: the face we show, the face we think we show, the face others see, and our true face. We, too are "polychroic", just like gems that change colors, but our changes are more subtle than color change. This takes serious contemplation, since people are often unaware of anything other than their consciously intended image.

In the Native American tradition,. there is a quality or power called "Owl Medicine". Owl Medicine is when a person can see the "true face" of others. For example, if a hostile person pretends to be pleasant, the Owl Medicine person can tell that real hostility lies behind the facade of amiability. Likewise, if a gentle dove of a person has to act tough in the face of enmity, the "Owl Medicine" person is again not fooled. The key to having Owl Medicine is to have an uncompromising honesty with oneself, first and foremost.

There can be real benefits to having the capacity to change colors like poly-chroic gems, or to adjust to the varying demands of reality on the physical plane. It is not necessarily anyone's business except your closest pals to know your true face. But each of us must at least really know and respect our true face, if we are to be honorable in projecting any other face to the outer world. We are all gems of many colors.

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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.

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*!

PARKIGN AT MAKIKI PARK

Parking along Keeamoku St. starts at 5:30
After that, good luck because it drops off really fast!

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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