

HUI PŌHAKU 'O HAWAII

Rock & Mineral Society of Hawai'i, Inc.



Meeting Times

MEETING

Wednesday

November 19, 2014

6:15-8:00 pm

Makiki District Park
Admin Building

NEXT MONTH

Xmas Potluck

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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P.O. Box 23020

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Gemstone Enhancements By Dean Sakabe

November's topic is Gem-stone Enhancements. It is not going to cover methods to treat a stone with the intent to deceive people, such as glass-filled Ruby's. This takes a highly fractured stone, makes it marketable by "clearing up the fractures", however they are very fragile and some common cleaning practices can make them fall apart.



Tanzanite rough, prior to heating and after heat treatment

What we will discuss are irradiating, heating, and other such processes which are routinely performed and usually fairly permanent.

Irradiating a gemstone is one of the oldest gem treatments. It can occur naturally over many, many years, such as the beautiful Petrified Wood from Arizona. Very few places possess agatized

wood with the reds and yellows from Arizona. These colors are made possible by the slightly radioactive minerals found within that area. It is not enough to cause harm to those who live there, but the bombardment over millennium which the agatized wood



High pressure, high temperature treatments can alter the atomic structure of some types of diamonds, in this case removing the brownish coloration and turning the diamond colorless

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received brought out these colors. Modern irradiation can be performed in labs, treatment facilities or nuclear reactors. Yes, those reactors, neutron irradiated orangey Topaz turns dark blue, it also makes the stones slightly radioactive, enough so that they have to sit for three months for this to dissipate. This little quirk, while producing very dark Blue Topaz, caused the Nuclear Regulatory Commission to step in and require the first distributors of these stones to be licensed, forcing them to rest the stones with the proper amount of time.

Currently, most irradiated gems are treated in licensed facilities that also treat medical equipment for sterilization purposes and food to prolong shelf life. These facilities will use gamma-type radiation, usually cobalt-60, which leaves no residual radioactivity in the product. The final product is safe to handle immediately following treatment, thus no rest time is required. Stones usually treated this way include most of the topaz's, green quartz (prasiolite), golden beryl, pink tourmaline, kunzite and smoky quartz.

Another method of irradiating Stones is to subject the stones to an Electron beam, from a Electron linear accelerator ("linac"). In the case of Topaz, if one further heat treats these same stones it will turn close to the brilliant "Swiss Blue" Topaz. What happens is the clear topaz turns a junky green/brown shade after neutron bombardment. When heated the green/brown turns Blue.

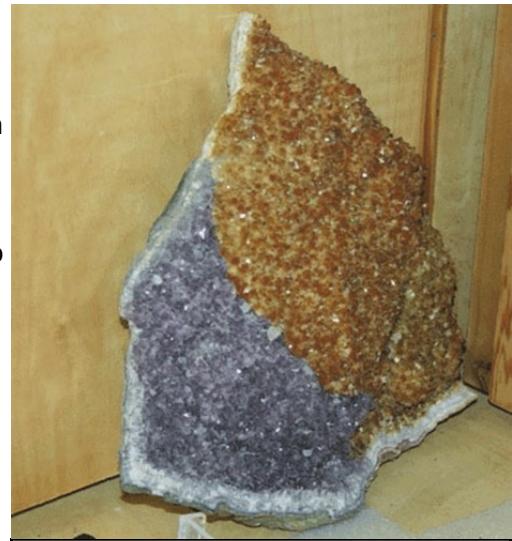
Heat Treatment of stones has been around for centuries. The people from India have been heating yellow Chalcedony to produce bright orange Carnelian since early 2000 BC.

Heat can lighten, darken, deepen or change a gemstone's color entirely. It can also eliminate inclusions, in addition to forming them. As with all things it depends on a number of factors including pressure, temperature, rate of heating and cooling and the chemistry of the stone. Heat usually affects a material's color by altering the chemical state of some of its atoms and thus its light absorbing pattern, but it can also change appearance in other ways. Some of the more commonly heated gemstones and the impact of heat upon them are:

Amber : Gentle heating oxidizes and darkens Amber. Bubbles can be removed by slow heating, generally whilst immersed in rape or linseed oil. Additionally, heat can be used to produce tiny fractures called "sun spangles." This is done by heating bubbles within amber to a point where they implode making discoid fractures which reflect light causing a "spangled" effect.

Beryl : The blue-green variety of Beryl, Aquamarine is a routinely heated. The color in Aquamarine is caused by iron impurities and it generally has 2 colors, yellow and blue, which when combined make green which is why most unheated aquamarine is a greenish blue color. Heating to approximately 400 degrees centigrade will remove the yellow, leaving just the blue.

Corundum : Heating of corundum, both Ruby and Sapphire varieties is a common occurrence, not to change the color, but to enhance the transparency. Heat causes structural changes in "silk" inclusions in ruby and sapphire. The rutile which forms the silk dissolves into the stone at high temperature (somewhere around 1800 degrees centigrade). Thus leaving a more transparent stone. Unheated rubies



This is a plate of amethyst that has been split in two, with one side being heated to produce the orange color change, then, placed back together.

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rubies and sapphires will contain microscopic rutile needles or tiny gas bubbles in pockets of liquid which are evidence that laboratories can use to guarantee that these stones have not been heated.

Topaz: Brown/Orange Topaz is routinely heated to produce Pink Topaz. This is also mostly a structural effect. Heating repairs crystal structural damage, reducing the yellow component, and turning the topaz pink.

Tanzanite: Tanzanite is an interesting case as the blues we know and love would not exist without heating. It is assumed that all Tanzanite is heat treated. Natural Tanzanite is a strongly trichroic gemstone with 3 colors - reddish-violet, blue, and yellow-green all combining to produce a brownish hue. The yellow-green component is removed with heating at 600 degrees centigrade, resulting in the blue or purple final color. Please note that heating does not enhance the color of the Tanzanite. A pale brown stone will produce a pale blue stone. But a dark brown stone will produce a deep blue Stone. All it does is change it from brown to blue.

Zachery Process (or Sterling Process, or the present Colbaugh Process) on Turquoise. James E. Zachery developed a method of treating Turquoise which does not use any type of Dyes (organic or inorganic), it also does not impregnate the turquoise with plastic, resin, wax, nor lacquer. What it does is that it somehow enhances the micro crystalline structure. How is not known. The process is highly proprietary and Mr. Zachery nor the current owner of the Process will divulge what the process entails. What the process does is to take medium to lesser quality turquoise and improves the color to a deeper greenish color, makes it harder, lessens the porosity of the stones. The outcome is a very hard evenly colored piece of turquoise that can be used in jewelry.



Emerald Valley Turquoise. Illustrating the results of treatment via the Zachery Process. Half was untreated, with the darker stone the treated stone. Little change is visible in the treated half (top) of the high quality (low-porosity) material. The medium quality turquoise shows distinctly higher color saturation in the treated half. The low quality turquoise also shows distinct color saturation.

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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.

Christmas Potluck Dinner

Dec. 5, 2014

Arts & Craft Building

6:00 pm — 8:00 pm

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