Arkansas Rockhound News

February 2020

Mission Statement

The Central Arkansas Gem, Mineral and Geology Society is dedicated to promoting interest in mineralogy and the related sciences, interest in lapidary and the related arts; to encourage field trips and the enjoyment of collecting and preserving minerals as they occur in nature, and the study of geological formations, especially those of our Natural State of Arkansas.

We are a small group of people that enjoy getting together to share our common interests.

Regular meetings are at the Terry Library 6:30 PM on the fourth Tuesday of the month (except December)

Terry Library is located at:

2015 Napa Valley Dr.
Little Rock, Arkansas
72212

Contrasting Luminosity in One Calcite Specimen

by Calvin Harris, South Suburban Earth Science Club (Illinois) via MWF News, February 2020

Introduction

This essay describes the observations regarding luminescent characteristics of a calcite specimen from the Sweetwater Mine in Missouri. The mineralogical conditions that formed this specimen allowed this sample to be studied as two separate entities. The attributes regarding calcite appear typical. However, the luminescent features observed are not generally anticipated, and information gained from studying this specimen is intended to supplement existing references regarding calcite from this location, as well as serve as an introduction for more comprehensive study.

An employee of The Doe Run Company, which owns Sweetwater Mine, operates a front-end loader by remote control. Photo from doerun.com.

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Arkansas Rockhound News is the official newsletter of the Central Arkansas Gem, Mineral and Geology Society. It is published monthly. To submit information, articles or photographs please email Nikki Heck, nikkiheck@windstream.net.

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HELP!
Send in your:
stories, articles, tips, photos
suggestions or questions!

Submissions due by the 28th of each month.

Meeting minutes...

January 28, 2020

submitted by Nikki Heck

21 in attendance.

Minutes from November meeting were reviewed and passed.

Show report: all is on track for the October show, almost all dealer paperwork is in. Lorrie has asked to purchase a grand prize during her upcoming trip to Tucson, AZ. Motion was made and passed for her to do so.

Last year the center run out of tables. One vendor is bringing their own tables this year. There is an open spot and where one vendor left and we are looking to fill that spot with someone who will sell jewelry making supplies.

We are working on flyer designs and plan to have them out earlier this year

The rock swap will be May 2nd.

Next month's program will be Laura Donaldson to speak about Slatington, AR. Also, Stephanie has secured programs for the year. (Way to go!)

Field trip to Batesville on February 15th. Meet at 8:30 or 9:00. Details to follow.

Educational trip to Mississippi (show and petrified forest) on February 22.

Memphis show will be April 25-26.

Books were audited and turned over to new treasurer, Barbara.

Meeting closed and auction began!

The calcite specimen is part of my study collection of minerals that exhibit fluorescence and phosphorescence. This collection mainly focuses on fluorescent minerals such as aragonite, calcite, strontianite, barite, fluorite and sphalerite that originate from various localities.

Geological Setting

Briefly, the Sweetwater mine is a Mississippi Valley Type (MVT) deposit located near Ellington, Missouri, Viburnum Trend District, Reynolds County, Missouri. MVT deposits are epigenetic, where low temperature (50°-200° C) saline solutions infiltrate limestone or dolostone strata. The Sweetwater mine has abundant quantities of lead and zinc for mining; nickel and cobalt are also mined.

Minerals such as calcite can be found, and fluorescence can occur when sufficient quantities of manganese and lead ions become incorporated within the crystalline structure of this mineral. It is likely that trace quantities of these ions were constituents of the saline solution. Additionally, decayed vegetative matter in the form of fulvic and humic acid can percolate through strata and form calcium salts of these acids. These compounds can function as organic activators. Rather than incorporate within the crystalline structure of calcite, these substances can bond to microscopic surfaces by adsorption.

Specimen Acquisition

Occasionally, I attend the South Suburban Earth Science Club's annual show, which is held at Prairie State College, Chicago Heights, Illinois. As a courtesy, a mineral dealer of long acquaintance allows me to examine minerals even when he is assisting other customers. He is equipped with a cardboard box that provides a darkened area to inspect candidate specimens with an ultraviolet lamp. I use a Raytech dual band ultraviolet unit in these situations. This unit provides shortwave and longwave radiation separately or in tandem. During an inspection, I noticed that the calcite crystals on the upper section of a specimen provided a red chromatic, moderately intense response to shortwave radiation, so I bought the sample for additional study.

Specimen Description

The upper section of this specimen consists of several truncated rhombohedron calcite crystals ranging from 3 inches to 3/16 of an inch on edge. These crystals are yellowish-brown in daylight, translucent and situated atop of a dark-gray limestone matrix. Additionally, small, unidentified gray druzy crystals are also present.

Specimen's upper section by day- light. Photo by Calvin Harris.

In contrast, the lower section of this specimen consists of minute, white, steep scalenohedral calcite crystals that are about 2/16 of an inch on edge. These crystals are associated with poorly formed galena crystals and partially formed chalcopyrite crystals.

Specimen's lower section by daylight. Photo by Calvin Harris.

Test Method:
Three different SuperBright II units and a SuperBright III unit were employed. These units are manufactured by UV SYSTEMS, Inc. The SuperBright II units emit 253nm (shortwave), 312nm (mid-wave), and 351nm (longwave) wavelengths; the SuperBright III unit provides 370 nm (longwave) radiation. A portable lead-acid battery distributed by UV SYSTEMS was also employed. The SuperBright units were placed some 3-4 inches from the specimen to determine fluorescence and were placed approximately 1-2 inches from the specimen to evaluate phosphorescence. Phosphorescence was evaluated before fluorescence to avoid eye sensitivity adjustment; I determined that a 10-second or 25-second exposure time was needed for careful observation.

A Vivitar 283 photographic flash unit was employed to evaluate flash, or intense phosphorescence of short duration. Only the upper portion of the specimen exhibited this property. Flash can be determined with conventional ultraviolet light sources by moving the light source quickly across the specimen, while the flash unit and specimen are stationary, which allows a better controlled testing arrangement. Moreover, the flash unit generally provides a more pronounced result than the conventional sources. The flash unit was used at its maximum output of visible, as well as ultraviolet, light. I held it at a distance of about 2-3 inches from the specimen. Evaluation is conducted by closing
one's eyes when the unit is discharged then observing the flash immediately after the discharge is completed.

Phosphorescence caused by discharging photographic flash bulbs and later flash units is well known among spelunkers and speleologists, who noted this effect while photographing stalactites and other speleothems. However, the application for studying mineral luminosity is less known. I began to experiment with electronic flash units some years ago to determine flash, which can be observed from certain calcite and other carbonate specimens. This application is best suited when inorganic activators are present; there is no advantage when organic activators are present. Currently, I use the Vivitar 283 flash unit during my investigations of fluorescent minerals.

Results from Exposure to Ultraviolet Radiation
Upper section of specimen: The mid-wave wavelength evoked a fluorescent response from the large calcite crystals that was more color saturated and brighter than the effects provided by other wavelengths. Interestingly, magenta rather than the typical red-orange response was observed. Moreover, shortwave radiation typically provides color saturation and intensity that are more prominent than other wavelengths. Application of the various wavelengths did not evoke significant difference in fluorescence regarding the druzy crystals. These crystals provided a gray, low intensity response.

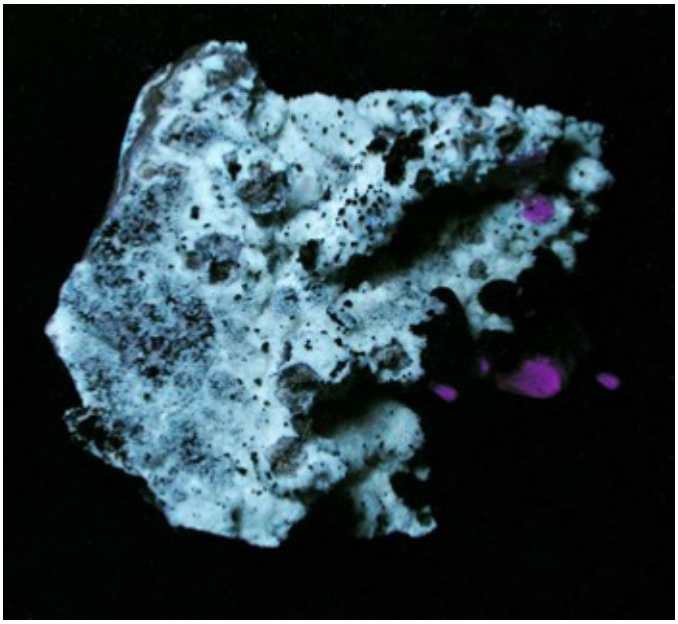

Upper section of the specimen under mid-wave UV radiation. Photo by Calvin Harris.

Phosphorescence was noted when the specimen was exposed to different wavelengths, but neither the large calcite nor druzy crystals gave this response. The reaction was likely due to calcite or another carbonate mineral that formed below the immediate surface. A 25-second exposure time was needed for careful observation. The shortwave wavelength provided a 7-second response of moderate-low intensity, while the mid-wave radiation gave an 8-second, gray-white, low-intensity response. The 351 nm

longwave wavelength provided a gray color, very weak intensity, which lasted 3 seconds. The color induced by the 370 nm longwave wavelength could not be determined; this was accompanied with extremely weak intensity. Moreover, these responses were restricted to a very small area of the specimen.

The mid-wave radiation was the only wavelength that provided flash; a magenta color with low intensity was noted. However, the Vivitar 283 flash unit provided the typical red-orange response. This response was notably brighter than the results gained by the conventional ultraviolet source.

Lower section of specimen: Fluorescence was evident when the four conventional wavelengths were applied. The mid-wave wavelength provided the most intense response, followed by the longwave wavelengths, while the shortwave radiation produced the weakest response. A gray, chromatic response was generated by the shortwave light, while the other wavelengths produced a cream-white response.



Lower section of the specimen under mid-wave UV radiation. Photo by Calvin Harris.

A 10-second exposure time was sufficient to evaluate phosphorescence. Generally, a gray, low-intensity response occurred upon exposure to the conventional wavelengths. The mid-wave wavelength provided the most prominent luminescent response. This wavelength evoked a 15-second response which far exceeded the other responses, which include 5 seconds for the shortwave and 4 seconds for the longwave wavelengths

Discussion

This specimen is a manifestation of two different mineralogical processes based on the luminescent responses aside from its physical attributes. Overall, the mid-wave radiation provided the most notable results among the wavelengths applied.

The fluorescence of the upper section was a crimson hue likely caused by the inorganic activators manganese and lead. The conventional ultraviolet light sources produced a chrisom luminescent response regarding fluorescence and flash. However, only the Vivitar 283 flash unit provided the red-orange response commonly observed in calcite specimens.

The lower section shows features that are typically caused by the presence of organic activators. The daylight color of the specimen, coupled with pastel fluorescent and phosphorescent responses, suggests the presence of these chromophores. However, in most cases the luminescent intensity is brighter and chromatic response is more vibrant than the results found in this study.

This is a rudimentary study featuring a calcite specimen from Sweetwater Mine with distinctive features not typical of specimens from this area, using recently developed sources of ultraviolet wavelengths and an alternative source of this radiation. This paper may serve as a starting point for additional study by specialists using spectrographic and chemical methods of analysis.

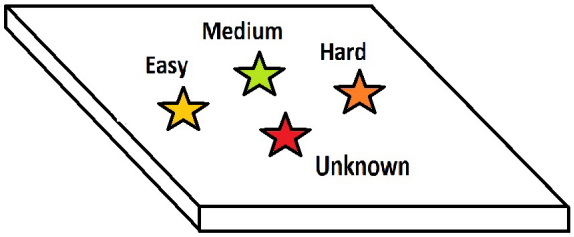
Selected References

Mindat.org (accessed April 2019) Sweetwater Mine, Ellington, Viburnum Trend District, Reynolds County, Missouri, USA.
Rakovan, John. Mississippi Valley-Type Deposits. Rocks and Minerals, 81(1): 69-71. January 2006.
Fisher, Jessie, Ross Lillie, John Rakovan. Fluorite in Mississippi-Valley Deposits. Rocks and Minerals, 88(1): 20-45. Jan/Feb. 2013.
Fairchild, Ian and Andy Baker. Speleothem Science, from Process to Past Environments. Oxford: Wiley-Blackwell, 2012, p. 251.
Robbins, Manuel A. The Collector's Book of Fluorescent Minerals, New York: Van Nostrand Reinhold Co., 1983, p. 261.

Field Trip to Midwest Lime, Batesville, Arkansas

Brad's bench tips...

Identifying Unmarked Solders



There are plenty of ways to mark your sheet or wire solders, but suppose you forgot to mark them and have a couple that you can't identify. The answer is to compare the melting temperature of the unknowns with that of a known solder. What I do is take a thick scrap of copper or nickel and arrange several solders on it. Ideally, I would have a sample of easy, medium and hard known solders surrounding the unknown solder. Then I heat the plate from the bottom and watch the order in which the solders melt.

Inexpensive Electric Wax Pen

You can make your own wax pen from a small soldering iron plugged into a light dimmer switch for heat control. Both components are easily found at a big hardware store or at Harbor Freight. As an example of the components, see items # 43060 and # 47887.

File the tip of the soldering iron into the shape you prefer or even better get a soldering iron with replaceable tips. Then you can make several tip shapes for different tasks. Set the dimmer control just hot enough to melt the wax without producing any smoke.

A tip design that I find ideal for some work is a length of small gauge wire that lets me reach in around the model to melt some wax. The wire is 18ga and about 15mm long. I use Sterling wire to conduct heat easily to the tip, and I silver solder it into a hole on the end of a copper or brass rod that fits into the soldering iron.

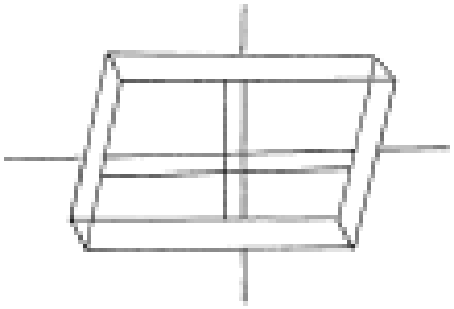
Learn New Jewelry Skills With Brad's Series of "How To" Books, www.Amazon.com/author/bradfordsmith

Kids Corner...

Brandon Heck is the Junior Editor of Arkansas Rockhound News. He is 11 years old and has enjoyed rockhounding since he could walk. In each issue he will share information about minerals that he loves and about his adventures in rockhounding.

Chemistry Experiment
Acid and Calcite

It is easy - and can be fun - to identify a calcite specimen. Is it gypsum? Is it fluorite? Is it quartz? Or is it calcite? A mineralogist uses the physical properties of minerals to identify them. Hardness is of these properties. Gypsum is softer than calcite; fluorite and quartz are harder. Another important physical property is cleavage. Quartz doesn't have cleavage at all. Fluorite has perfect octahedral cleavage (that means it breaks into perfect diamond-shaped pieces). Gypsum has good cleavage but only in one direction. Calcite breaks into perfect rhombs. A rhomb has 8 sides like a square, but it looks like the box has been pushed to form angles. It looks like this:



Calcite has two other physical properties that set it apart from all other common minerals. The first is that it bends light into two rays. Put a piece of clear calcite (called "Iceland Spar") on an image, and you will see two images! This is called "Double Refraction."

And now, for your chemistry experiment! Professional mineralogists use a chemical called hydrochloric acid. They put mix water with a little bit of this acid and then put it on a piece of calcite.

Warning: Never play with acid! This experiment uses a strong acid that can hurt you. Instead, you will use an acid that is in your kitchen: vinegar.

What happens? The acid reacts with the calcite and forms carbon dioxide gas. You can see it as the gas bubbles on the surface of the specimen.

But we don't want YOU playing with a strong, dangerous acid like hydrochloric acid. But there are things in your kitchen that will give you the same results.

Put a drop of lemon juice or vinegar on a piece of calcite. Take a magnifying glass and look very closely at the drop of vinegar. What do you see? You will see very small bubbles. When acid is placed on calcite, you will see bubbles. And you will know instantly that the specimen you have is … Calcite!

from the February 2020 MiniMiners Monthly by Diamond Dan Publications

Upcoming area shows...

March 2020

7-8—BIG SPRING, TEXAS: Annual show; Big Spring Prospectors Club; Howard County Fair Barn, 2900 Old State Hwy 80; Sat. 9-5, Sun. 10-5; free admission; Dealers offering minerals, jewelry, beads, rough rocks, slabs, geode cutting, demonstrations, activities for children; contact Lola Lamb, 2200 Cecilia, Big Spring, TX 79720, (528) 732-3; Email: lolabellelamb@yahoo.com; Website: https://www.facebook.com/bigspringprospectorsclub/

7-8—ROBSTOWN, TEXAS: Annual show; Gulf Coast Gem and Mineral Society; RMB Fairgrounds, 1213 Terry Shamsie Blvd, Exhibit Hall A; Sat. 10-6, Sun. 10-4; Adults $6, free admission for scouts in uniform and children under 12; 58th annual show, with vendors selling rocks, minerals, gems, fossils, and minerals, lapidary materials, exhibits, demonstrations, and fluorescent display, and activities for children; contact Russell Wheeler, POBox 60781, Corpus Christi, TX 78466, 361-944-7877; Email: gulfcoastgemandmineralsociety@gmail.com; Website: gcgms.org

13-15—AUGUSTA, GEORGIA: Annual show; Augusta Gem and Mineral Society; Aiken Gem, Mineral and Fossil Society; Julian Smith Casino, 2200 Broad Street; Fri. 10-6, Sat. 10-6, Sun. 11-5; Adults $4 (weekend pass $6), free admission for children under 12 accompanied by a paying adult; Member display cases, demonstrations, dealers selling geodes, silver, jewelry, gemstones, cabochons, crystals, minerals, fossils, meteorites, and activities for children; contact Richard McNutt, GA; Email: Rmcnutt9@comcast.net; Website: Agams.club

13-15—KANSAS CITY, MISSOURI: Wholesale and retail show; Greater Kansas City Association of Earth Science Clubs; KCI Expo Center, 11730 NW Ambassador Dr.; Fri. 10-8, Sat. 10-7, Sun. 10-5; Adults $6 (2-day pass $10, 3-day pass $14), ages 5-12 $3, free admission for children age 4 and under; 60 dealers, lectures, demonstrations, exhibits, scholarship benefit auction – 7 p.m. Saturday, activities for children; contact Mark Sherwood, PO Box 436, Oak Grove, MO 64075, (816) 690-3773; Email: markdsherwood@comcast.net; Website: www.kcgemshow.org

14-15—SAN ANTONIO, TEXAS: Annual show; Southwest Gem and Mineral Society; San Antonio Event Center, 8111 Meadow Leaf Drive; Sat. 10-6, Sun. 10-4; Adults $5, military and seniors $3, students $1; 26 dealers, displays, demonstrations, silent auction supporting university scholarships, activities for children; contact Robert Bowie, 1324 Kings Point Drive, Canyon Lake, TX 78133, (830) 387-1766; Email: krbotx@gvtc.com; Website: SWGMS.ORG

20-22—MARIETTA, GEORGIA: Annual show; Bellpoint Gem Show; Cobb County Civic Center, 548 S. Marietta Pkwy.; Fri. 10-6, Sat. 10-6, Sun. 10-5; Adults $5, free admission for children under 15 when accompanied by a paying adult; Gem dealers from near and far selling crystals, fossils, beads, jewelry, geodes, minerals, gems and rocks from all over the world. ; contact Damian; Email: mbellpoint@gmail.com; Website: www.bellpointpromotions.com

21-21—CARTERSVILLE, GEORGIA: Show; Tellus Science Museum; Tellus Science Museum, 100 Tellus Dr.; Sat. 8:30-5; Members: $30, Non-members: $40; Tellus Mineral Symposium 2020, featuring speakers discussing building a collection, valuing your collection, organizations of collectors, and going out in the field to collect. Prepaid reservation required; contact Asia Johnson, 100 Tellus Dr., Cartersville, GA 30120, (770) 606-57; Email: ryanr@tellusmuseum.org; Website: tellusmuseum.org

27-28—ADA, OKLAHOMA: Annual show; Ada Gem, Mineral, and Fossil Club; Pontotoc Country Agri-Plex, 1710 North Broadway; Fri. 8-6, Sat. 9-5; free admission; Features various demonstrations, displays, fluorescent minerals, fossils, lapidary, and jewelry, and an educational booth hosted by the Oklahoma Geological Survey ; contact Bobby Freeman; Email: bfreeman.1966@yahoo.com

27-29—BRIDGETON, MISSOURI: Annual show; Rock Hobby Club of Greater St. Louis; Machinists Hall, 12365 St. Charles Rock Road; Fri. 4-8, Sat. 10-7, Sun. 10-5; Adults $4, free admission for scouts in uniform and children 12 and under; Vendors, exhibitors, demonstrators; contact Roy Hurlburt, 2942 Piney Pointe Dr, St Louis, MO 63129, (314) 303-7218; Email: hurlburtr@juno.com; Website: https://rocksrulestl.com/

27-29—LEXINGTON, KENTUCKY: Retail show; Blue Grass Gem and Mineral Club; Clarion Hotel Conference Center, 1950 Newtown Pike; Fri. 4-8, Sat. 9-6, Sun. 10-5; Adults $5 (Special Friday preview $10 - good for all three days), free admission for youth under 18 when accompanied by an adult; Friday Preview Night features special deals and a door prize, with a more than four-foot amethyst geode, raffles, demonstrations, and activities for children; contact Jane Volk, 3133 Dale Hollow Rd, Lexington, KY 40515, (859) 351-3323; Email: jane.volk@outlook.com; Website: http://bggamc.homestead.com/Lexington-Rock-Gem-and-Jewelry-Show.html

CAGMAGS
2020 Spring Swap

May 2nd
Elder Johnson Pavilion
Burns Park
North Little Rock
9AM – 3PM
Buy, Sell or Trade

Rocks, Minerals, Fossils and other related items

Limited tables available bring your own or tailgate

There is no charge to set up or attend

Take the Military Drive exit off I40, the swap is located next to the visitor center

For more information contact John Schoeneman

501-679-4531, cagmagsprez@gmail.com

www.centralarrockhound.org

MEMBERSHIP FORM
Central Arkansas Gem, Mineral and Geology Society
Membership Dues: $15 / year Individual; $25 / year Family

Make checks payable to: "Central Arkansas Gem, Mineral and Geology Society".

Name:_____ Date _____

Business Name: _____ Birthday: Mo._____ Day _____

Address: _____ Anniversary: Mo._____ Day____

City:_____ State: ____ Zip:_____ Phone No._____

Cell Phone_____

Email address:_____ Occupation _____

How would you like your Club Newsletter delivered? U.S. Mail____ Email____

Family Members are considered as all of those living at the above address.

Please list their names, Birthday Mo./Day, if applying for a Family Membership.

Because of limited space, only one name will appear on the newsletter mailing label.

How did you hear about our Club?

_____

How long have you been interested in this hobby? _____ Do you have any equipment? _____

I would be interested in Attending ____ Hosting ____ work shop in _____ (subject)

on_____(day of week)

Please circle your club interests:

Mineralogy Lapidary Fossils Field Trips Geology Carving

Collecting Jewelry Making Casting Silversmithing Beading Wire Wrap

Other_____

Outside Interests: _____

These will be listed in the Membership Directory, so that members can find others with similar interests. In what areas would you be able to assist the Club:

Social Publicity/Advertising Educational Junior Programs Membership

Annual Show Committee Work Newsletter Articles Mineral Display

Other:_____

What would you like to see the club focus on in the coming year?_____

_____ I do not want my name to appear in the Club Directory.

_____ My name and address can appear, but NOT my Phone Number.

_____ Please do NOT include specifically the following info about me:_____

Central Arkansas Gem,
Mineral & Geology Society
PO Box 241188
Little Rock, AR 72223

March program
Mike Howard -
Arkansas Meteorites

Spring Swap-May 2nd

48th Annual CAGMAGS show
October 3rd & 4th

2020 Meeting Dates

February 25th
March 24th
April 28th
May 26th
June 23rd
July 28th
August 25th
September 22nd
October 27th
November 24th

Note- any changes of meeting location will be announced via email and phone

Join CAGMAGS!

Membership Dues - $15 Individual, $25 Family (Yearly)

Visit www.centralarrockhound.org to learn more!