Calcite Crystals, MW 312nm* – 12.2cm×6cm×4.6cm - *Calvin Harris

Friends of Mineralogy – Midwest

January – February 2023 Newsletter

Treasurers Report

On page 15, you will find the 2022 Interim Financial Report. Expenses were low for this year due to no 2022 Symposium and a National dues credit. Our membership is also down significantly! Consider forwarding the registration instructions to others in your local clubs.

New (Old) Chapter Newsletters are now available on the Chapter website!

There are now 35 years of chapter history to browse through on the website.

Special thanks to charter member Dan Hall's diligence through the years to save and store every issue and his daughter Sara's work to sort through them and bring them to Cincinnati for scanning!

You can access them from the 'library' tab on the website.

https://www.fommidwest.org/library/

2023 Chapter Dues Payment on-line option

At the Friends of Mineralogy Midwest Chapter annual meeting, it was decided that dues for 2023 would remain the same as 2022.

You have 2 options for payment now.

1. You may print the form and mail it with your $20.00 payment

2. You may pay on-line ($21.00) through our website with a credit/debit card or PayPal. You do **not** need a PayPal account to use a credit card/debit! Our website has received security verification and certification.

Both options are available via our website: https://www.fommidwest.org/registration-forms/
Please contact me if you are unsure of your current status or if you have questions or difficulties.

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How Ultraviolet Radiation Reacts with Calcite and Celestine from Maybee, Michigan
by Calvin Harris

Introduction

A large number of mineral collectors are familiar with calcite ($CaCO_3$) and celestine ($SrSO_4$), from Maybee, Monroe County, Michigan. Some collectors know that these minerals may exhibit fluorescence and phosphorescence. There are publications that describe the luminosity of these minerals, but they include a large number of mineral species and by necessity, descriptions are brief. This paper supplements the basic descriptions by including the fluorescent and phosphorescent color responses and intensities, as well as, phosphorescent duration when four wavelengths of ultraviolet radiation effect certain specimens from this locality.

Geological Setting

Maybee, Michigan is located in Southeastern Michigan and the geology of this area consist largely of carbonate rocks and sandstone that formed during the Silurian and Devonian periods. The area of interest is the Detroit River Dolomite of the Middle Devonian period, which consists of brown and gray limestone with small vugs. Dolomite is also present and shares the same descriptive qualities, but has a dense microcrystalline texture. Calcite and celestine form within vugs and sulfur has been reported to form in fractures within the deposit.

Mineral Description

Specimen A is composed of transparent low steeped rhombohedron calcite crystals measuring 1mm. These crystals are scattered throughout the surface of the specimen. Additionally, opaque, poorly developed sulfur crystals measuring 3mm-19mm are located on the periphery of the specimen. The calcite and sulfur crystals rest on a light gray limestone or dolostone matrix. The specimen measures 15.7cm×11.5cm×5.7cm.

Specimen B consists of translucent, light blue, tabular orthorhombic celestine crystals with light beige calcite crystals. The celestine crystals measure 4mm-40mm. The calcite crystals were too small to measure using as 30cm ruler. All crystals have glassy luster. This specimen measures 8.3cm×7.3cm×5cm.

Specimen B Daylight

Specimen C is made of a large cluster and smaller calcite crystals. The crystals range from 1.2cm to 2.2 cm. These crystals are light brown, translucent prismatic forms with glassy luster. The celestine consists of dark beige micro-crystals with a dull luster. The matrix is a light gray limestone or dolostone material. This specimen measures 12cm×8.3cm×5.2cm.

Specimen D Daylight

Specimen D (Obverse) is comprised of light tan, translucent low steeped translucent rhombohedron calcite crystals measuring 5mm-23mm on edge. In addition, some tan colored, glassy, opaque celestine microcrystals and minor amounts of white opaque celestine crystals are present. The celestine crystals measure 12mm-15mm on edge.

Specimen D (Reverse) is comprised of white, opaque platy celestine crystals. They measure 10cm-20mm on edge. These crystals are located on one side of the specimen. Minor amounts of celestine are located on various areas of the specimen. The crystals are perched on a gray-tan limestone or dolostone matrix. The specimen measures 12.2cm×6cm×4.6cm.

Test Procedures

The procedures allow collectors to carefully determine fluorescence and phosphorescence in the field and under controlled conditions. They are easily repeatable and provide consistent results.

Three, SuperBright II lamps and one SuperBright III lamp were the sources of ultraviolet radiation. The SuperBright II lamps emit wavelengths measuring 254nm (shortwave), 312nm (mid-wave) and 351nm (longwave), while the SuperBright III lamp emits a longwave wavelength of 370nm. Fluorescence and phosphorescence are determined by placing the lamps from the specimens 3-4 inches and 2-3 inches, respectfully. A 10-second exposure time was used to produce phosphorescence. Between testing, a delay of two minutes allowed phosphorescence to dissipate and prevent misleading results caused by subsequent exposure. An AC electric source was used to operate the ultraviolet lamps.

The effects of various ultraviolet wavelengths are provided below:

Results of Specimen A

Wavelength	Fluorescence	Phosphorescence
254nm (Shortwave)	**Calcite**: Light blue, moderate-bright intensity.	**Calcite**: Lime-green, bright intensity, 9-second duration.
312nm (Mid-wave)	**Calcite**: Similar to Shortwave, except less color saturation.	**Calcite**: Color similar to Shortwave, except less saturated; bright intensity; 10-second duration.
351nm (Longwave)	**Calcite**: Color similar to shortwave; moderate-bright intensity.	**Calcite**: White with lime-green tint; bright intensity; 8-second duration.
370nm (Longwave)	**Calcite**: Similar to Shortwave.	**Calcite**: White coloration; moderate intensity; 8-second duration.

Results of Specimen B

Wavelength	Fluorescence	Phosphorescence
254nm (Shortwave)	**Calcite**: lime-green, bright intensity. **Celestine**: brown, moderate-low intensity.	**Calcite**: yellow, bright intensity, 13-second duration. **Celestine**: lime-green bright intensity, 13-second duration.
312nm (Mid-wave)	**Calcite**: Similar to Shortwave. **Celestine**: Similar to Shortwave, except slightly brighter,	**Calcite, celestine** similar to Shortwave.
351nm (Longwave)	**Calcite**: yellow, bright intensity. **Celestine**: tan, moderate intensity.	**Calcite**: pale yellow, low intensity, 8-second duration. **Celestine**: gray, low intensity, 8 second-duration. intensity; 8 second duration.
370nm (Longwave)	Similar to Longwave 351nm.	Similar to Longwave, 351nm.

Specimen B LW 351nm

Results of Specimen C

Wavelength	Fluorescence	Phosphorescence
254nm (Shortwave)	**Calcite**: Sky-blue color, moderate-bright intensity. **Celestine**: Yellowish-tan, bright intensity.	**Calcite, celestine**: sky-blue, bright intensity, 9-second duration.
312nm (Mid-wave)	**Calcite**: Pale-blue, violet, bright intensity. **Celestine**: Yellowish-tan, moderate-bright intensity.	**Calcite**: Sky-blue, moderate-bright intensity, 5-second duration. **Celestine**: Yellowish-tan, moderate bright intensity, 13-second duration.
351nm (Longwave)	**Calcite**: Similar to Mid-wave, except no violet, moderate intensity. **Celestine**: Similar to Mid-wave, except moderate intensity.	**Calcite, celestine**, similar to Shortwave, except moderate-bright intensity, 8-second duration.
370nm (Longwave)	**Calcite, celestine**: Similar to Mid-wave. Except moderate intensity.	**Calcite, celestine:** Similar to Shortwave, except moderate-low intensity, 7-second duration.

Specimen D MW 312nm

Results of Specimen D (Obverse)

Wavelength	Fluorescence	Phosphorescence
254nm (Shortwave)	**Calcite**: bluish-gray, moderate-low intensity. **Celestine**: Canary-yellow, bright intensity.	**Calcite**: Undeterminable. **Celestine**: Lime-green, moderate-bright intensity, 13-second duration.
312nm (Mid-wave)	**Calcite**: Bluish-gray, moderate intensity. **Celestine**: Canary-yellow, bright intensity.	**Calcite**: Undeterminable. less saturated. **Celestine**: Canary-yellow, bright intensity, 10 second duration.
351nm (Longwave)	**Calcite**: Similar to Mid-wave. **Celestine**: Similar to Mid-wave, except greater color saturation.	**Calcite**: Undeterminable. **Celestine**: Pinkish-gray, low intensity, 8-second duration.
370nm (Longwave)	Similar to Longwave 351nm.	Similar to Longwave 351nm, except 7-second duration.

Results of Specimen D (Reverse)

Wavelength	Fluorescence	Phosphorescence
254nm (Shortwave)	**Celestine**: Blue-gray, moderate-low intensity.	**Celestine**: Sky-blue, moderate-low intensity, 6-second duration
312nm (Mid-wave)	**Celestine**: Same as Shortwave, except moderate intensity.	**Celestine**: Same Shortwave, moderate intensity, 6-second duration.
351nm (Longwave)	**Celestine**: Blue-violet, low intensity.	**Celestine**: Same Shortwave, low intensity, 5-second duration.
370nm (Longwave)	Same as Shortwave, low intensity.	Blue-gray, very low intensity, 4-second duration.

Discussion

- The results show diverse responses, which is interesting considering the specimens originated from the same locality. The responses indicate that different activators were involved.
- The ambiguity among the results can be resolved by testing a large number of specimens. An in-depth study to identify the type and role of the activators should help explain any unexpected results.
- The phosphorescence of calcite in Specimen D (Obverse) was undetermined due to celestine's bright response.
- A supplementary article to this essay will describe how *flash* or phosphorescence characterized by bright intensity and brevity, will offer some information about inorganic and organic activators related to these specimens.

Selected References

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Medici, John C. Celestine and Sulfur. Rocks and Minerals, 58(3): 125-128. May/June 1983.

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Testing of Selected "Blue Blocking" and LW UV Blocking Lenses, To Determine Those That Effectively Block Both 405nm Blue Light from a Blue Light Laser and 365nm LW Light from a LWUV Source.

By J. Michael Howard
Arkansas State Geologist and Mineralogist (retired 2013)
Author of several works on the mineralogy of Arkansas
December, 2022

Purpose of Experiment

Presently I have over 400 fluorescent specimens in my collection which I want to examine with a blue light 405nm laser, unfocused at a distance of ~6 inches, to determine if the color exhibited in that wavelength is similar to its color in the commonly used 365nm LW UV light. To do this, I ordered a variety of glasses sold on eBay as having blue blocking and UV blocking properties.

Image 1 - Various colored "blue blocking" lenses.

The lenses in the image (above) were tested to ascertain if they would block either/both 365nm UV and 405nm blue laser light. From left to right in the picture above, they are: 2 different manufacturers of clear lenses (called Clear #1 and Clear #2); yellow glasses; yellow motorcycle goggles, blue lens glasses, green lens glasses, orange lens glasses, red lens glasses, and a pair of very lightly tinted clip-on lenses (listed as Clear Lens Blue Light Blocking Computer Glasses Clip On - eBay). These were all essentially sold as blocking either Ultraviolet Radiation (light) or blue light. *Some do and some do not!* All of the lenses in the picture were manufactured in China.

Not in the picture above is a separate pair of 455nm orange blocking lenses that were tested that my wife purchased to use with her blue diode laser cutter. I am uncertain as to the lens origin, but this item was sold as safety goggles for a 455nm blue diode laser and cost $80US, as much as 12 times the cost of the other lenses shown. And finally shown is a single light orange lens that in the past I have used as a LW reflection filter for many of my pictures.

The two LW fluorescing minerals used to test these glasses include reddish purple ruby crystals from Kiteto District, Manyara Region, Tanzania, and colorless, opal (An) "hyaline" from Wushan Spessartine Mine, Fujian, China.

Each mineral was placed ~ 6 inches from the light source, first using 365nm source and then a 405nm laser defocused to present a spot about the size of a US quarter (0.94" = 2.39 cm). Each set of lenses were inserted between the source and the fluorescent mineral. Blockage was noted as yes (completely blocked the beam), no (beam was transmitted), or minor trans. (beam was partially blocked).

Table 1 – Absorption/ Transmission of 365nm and 405nm light.

Lens color	365nm blocked	405 nm blocked	Mineral sample
Clear #1	yes	no	Opal
Clear #1	yes	no	Ruby
Clear #2	yes	no	Opal
Clear #2	yes	no	Ruby
Yellow glasses	minor trans.	no	Opal
Yellow glasses	yes	no	Ruby
Yellow goggles	minor trans.	no	Opal
Yellow goggles	yes	no	Ruby
Blue lens glasses	no	no	Opal
Blue lens glasses	no	no	Ruby
Green lens glasses	yes	yes	Opal
Green lens glasses	yes	yes	Ruby
Orange lens glasses	yes	minor trans.	Opal
Orange lens glasses	yes	minor trans.	Ruby
Red lens glasses	yes	yes	Opal
Red lens glasses	yes	yes	Ruby
V. pale yellow clips	yes	yes	Opal
V. pale yellow clips	yes	yes	Ruby
455nm orange gl.s	yes	yes	Opal
455nm orange gl.s	yes	yes	Ruby

Observations: All of the glasses examined down through and including the Blue Lenses on Table 1 are unsuitable for my purpose, because 405 reflections would be allowed to be transmitted, endangering my retinas. From the green lens glasses on down the table, the 405nm reflections from the mineral would be blocked, therefore providing retina safety.

However, the green, orange and red lenses, along with the orange 455nm lenses are very strongly colored, thus potentially presenting a false color when used with 405nm light. The only set I have so far found to give a reasonable color rendition and safely block 405 reflections are the Computer Blue Light Blocker clip- on lenses in Table 1 and shown in the far right of the image.

When I start to examine many fluorescent specimens in the near future, with the 405nm laser, I will use the set of clip-ons to prevent retina damage. The clip-on glasses do fluoresce a pale blue color, but when not directly in either the 405nm laser or 365nm lamp, the fluorescence is negligible, though a minor annoyance. I will modify these lenses slightly by coating the rim of the lenses with an opaque black magic marker to reduce that distraction. They also have a slightly blue colored reflective coating, not seen in the picture.

Conclusion:
I am only interested in observing the UV 365nm and 405nm colors given off by exposure to those wavelengths, while deleting any blue light reflections from a mineral's reflective surfaces. To learn what lenses were effective, I used each to block the direct beam from the source to the two minerals, and if the mineral did not fluoresce, then the lens was considered effective in removal of those wavelengths.

I was hoping to find a colorless or near colorless pair of lenses to use and I did. Also of interest, the fluorescence of the opal specimen with no lens between it and the eye was bluish white in 405nm, but was a strong lime green when the clip-on glasses were worn. The ruby fluoresced a bluish red in 405nm with no filter, but when viewing with the clip-on glasses it was a strong bright red.

A final word of caution, just because a set of lenses or glasses are sold as being blue blocking or UV blocking, do not trust them until you have tested them in a similar manner as done in this experiment!

Life's Not Fair: Get Used to It. 2022 mineral collecting gaffes. Pictures and notes By Johan Maertens ©

Collecting sphalerite (right, top) on a giant boulder dominated by another collector. Realizing the specimen just broke off 😔 and dropped 4 feet between a pile of large rocks. Smile 😊 after moving a ton of rocks and finding the specimen mostly undamaged (right lower). Graymont Dolime, Clay Township, Ohio

Sphalerite, Graymont Dolime, Clay Township, Ohio

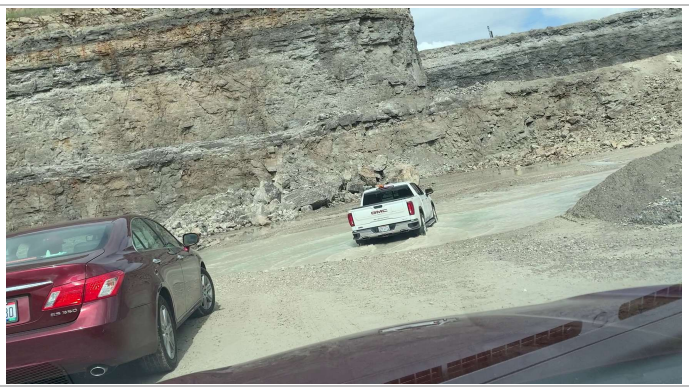
Top: in situ, prior to extraction

Bottom: collected and cleaned, 37 mm wide Graymont Dolime, Clay Township, Ohio

Finding a large calcite crystal vug in the middle of a 10 ton bolder and watching Tom Bolka chip off a nice piece 👍 😊, unable to extract the rest 😧.
Lafarge North America Marblehead Quarry, Danbury Twp, Ohio

Spending $150 on quarry safety equipment 😎. After extracting a large rock from a big pile, for half an hour, trimming and splitting nice, until right above and then cleaving through the calcite below 😧. Lafarge North America Marblehead Quarry, Danbury Twp, Ohio

Seeing a large patch of purple on white marble. Climbing over a pile with sharp loose rock to get to the rare fluorite treasure. Realizing they are fresh bird droppings during berry season. 😜
Barrett Paving, Ludlow Falls, Ohio



Following Mike Royal's truck through a deep drainage and realizing you are driving a sedan loaded with gear and three collectors 😓.
Sylvania Minerals, South Rockwood, Michigan

Finding vugs filled with petroleum on pyrite and calcite. Not enough to refill the car's gas tank to make it home, enough to stain the seats forever.
Barrett Paving, Ludlow Falls, Ohio

Driving 3 hours to the quarry. Restricted collecting to only a small emptied out area. Scraping the bottom and praying to find something. Clyde Spencer in
Lehigh Quarry, Mitchell, Indiana

Finding a trilobite and a calix and forgetting to put the critter in on a leash. Gone forever 😖. New Point Stone, St. Paul, Indiana

Seeing large calcite crystals in vugs and forgetting to bring your 30 - foot extension ladder 😕. Bye, bye. New Point Stone, St. Paul, Indiana

Friends of Mineralogy Inc Midwest Chapter

2022 Interim Financial Statement - 12/15/22	Amount
Beginning Account Balance	**$8,739.89**
INCOME	
2022 dues paid in 2022	$1,240.00
2023 dues paid in 2022	$280.00
Total Dues Amt. Received in 2022	**$1,520.00**
Symposium Donations check/cash	$25.00
Symposium Donations PP	$20.00
Total Symposium Donations	**$45.00**
General Fund donations check/cash	$430.00
General Fund donations PP	$157.27
Total General Fund Donations	**$587.27**
Fund raising	$0.00
other income - National Dues Rebate	$84.00
Total Non-Dues income	**$716.27**
Total Income	**$2,236.27**
EXPENSES	
Web domain registration and protection, 2 years	$120.64
Web site hosting 1 year	$107.88
Website Security Certificates 2@ 13.90	$27.80
Insurance Premium 2022	$650.00
Ohio Continuing Operations Report Filing	$25.00
National Dues payment 16 members	$64.00
Total National Dues 81 @ 4	$324.00
paid in previous year 328 credit - 84 refunded	-$244.00
Total National Dues Paid 2022	**$64.00**
2022 National dues still owed	$16.00
Total Disbursements	**$995.32**
2021 Surplus	**$1,240.95**
Current Account Balance USBank & Paypal	**$9,980.84**
2021 members	89
2022 new members	15
2022 members registered	81
2022 membership gain(loss)	-8
2023 members registered	14

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Midwest Chapter

APPLICATION FOR MEMBERSHIP

MEMBER DATA SHEET

Please fill in this application and mail it along with your dues to the address listed at the bottom.

Name _____
Last First Middle Initial

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Would you be willing to serve as an officer or committee member/chair? _____

Would you be willing to serve in another volunteer capacity? _____

How did you find out about Friends of Mineralogy? _____

I affirm that I support the purposes* of Friends of Mineralogy:

Signature _____ **Date** _____

Friends of Mineralogy, Inc. is composed of the members of 7 local chapters, plus national members not affiliated with a chapter. **Prospective and renewing Midwest Chapter members should send this completed application and $20.00/year dues to the address below:**

Our Chapter is funded by membership fees, fundraising efforts and additional contributions. Please consider an additional contribution to help support us in achieving our Chapter Mission. We will email you a receipt for tax reporting purposes.

Additional donations: ☐ **Annual Symposium** **$**_____

☐ **General Fund** **$**_____

Total (including Dues **$**_____

*

1. To promote interest in and knowledge of mineralogy.
2. To advance mineralogical education.
3. To protect and preserve mineral specimens and promote conservation of mineral localities.
4. To further cooperation between amateur and professional and encourage collection of minerals for educational value.
5. To support publications about mineralogy and about the programs of kindred organizations.

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