

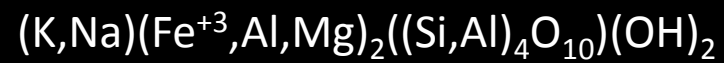
**A STUDY OF GLAUCONITE**  
**from**  
**HURRICANE MTN., CONWAY, NH**

Tom Mortimer



**GLAUCONITE**

Hurricane Mtn., Conway, NH

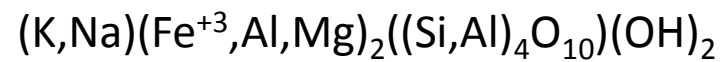


3.5 cm specimen



**GLAUCONITE**

Hurricane Mtn., Conway, NH

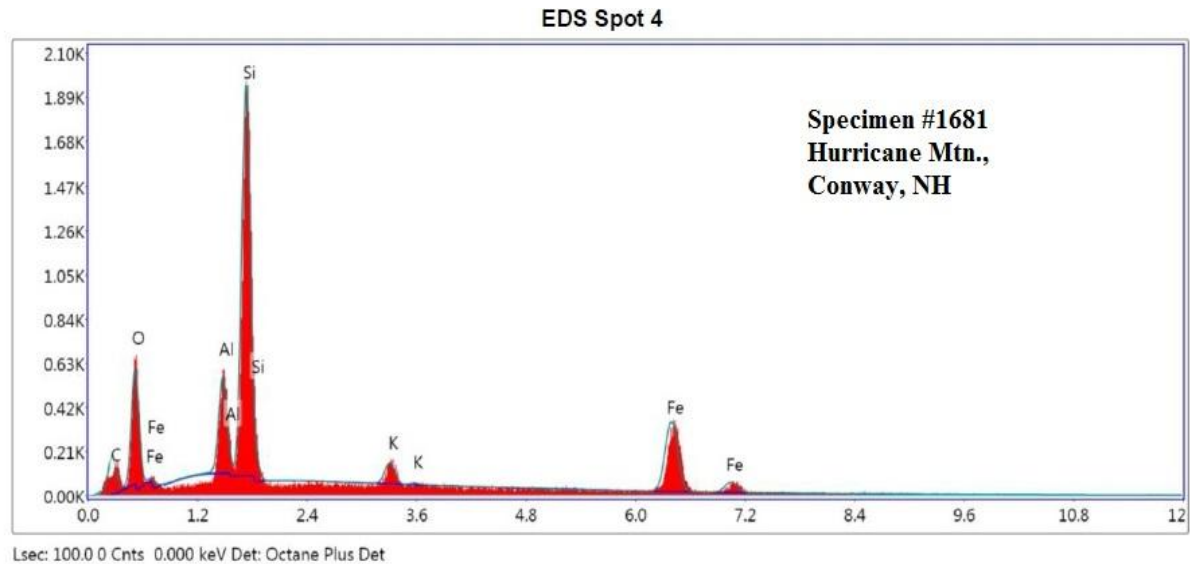


3.5 cm Gordon Jackson specimen

## BACKGROUND

- This species was first identified from Hurricane Mtn. by Peter Samuelson several decades ago.
- It is unknown what method or resource Peter used to arrive at this identification.
- New England collectors have applied the glauconite ID to this mineral for decades.
- It has appeared in several NH species lists in *Rocks & Minerals*.
- Glauconite is a mica group mineral

## Polished grain EDS analysis, February, 2019



### eZAF Smart Quant Results with Carbon Coat 18nm

Element	Weight %	Atomic %	Net Int.	Error %	Kratio	Z	R	A	F
OK	19.47	36.07	62.12	10.30	0.09	1.15	0.93	0.41	1
AlK	7.76	8.53	51.46	7.56	0.05	1.02	0.97	0.64	1.01
SiK	30.71	32.41	214.52	5.18	0.22	1.04	0.98	0.71	1
KK	2.92	2.22	13.26	13.39	0.03	0.97	1.01	0.91	1.02
FeK	39.14	20.78	54.16	4.74	0.33	0.87	1.04	1	1

•The 2/2019 mindat.org formula for glauconite was given as



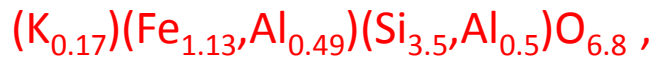
indicating **Mg is essential**.

•Webmineral.com, the RRUFF database, and the IMA, give the glauconite formula



suggesting that **Mg is NOT essential**.

•My glauconite EDS analysis above computes a formula of



normalized for 3.5 Si and distributing the Al so as to make  $(Si + Al) = 4$ , as in the webmineral/Ruff formula. This results in the  $(Fe + Al)$  being close to 2, but the K is very low.

•Following a long mindat.org message-board discussion, mindat changed their formula to agree with the IMA and RRUFF.

## Some highlights for the lengthy mindat.org message-board discussion:

### Alfredo Petrov

Seems to me that for practical purposes outside of laboratory settings, if the mineral occurred in a sedimentary rock it was called "glaucosite" and if in a volcanic rock it was called "celadonite".

### Ralph Bottrill

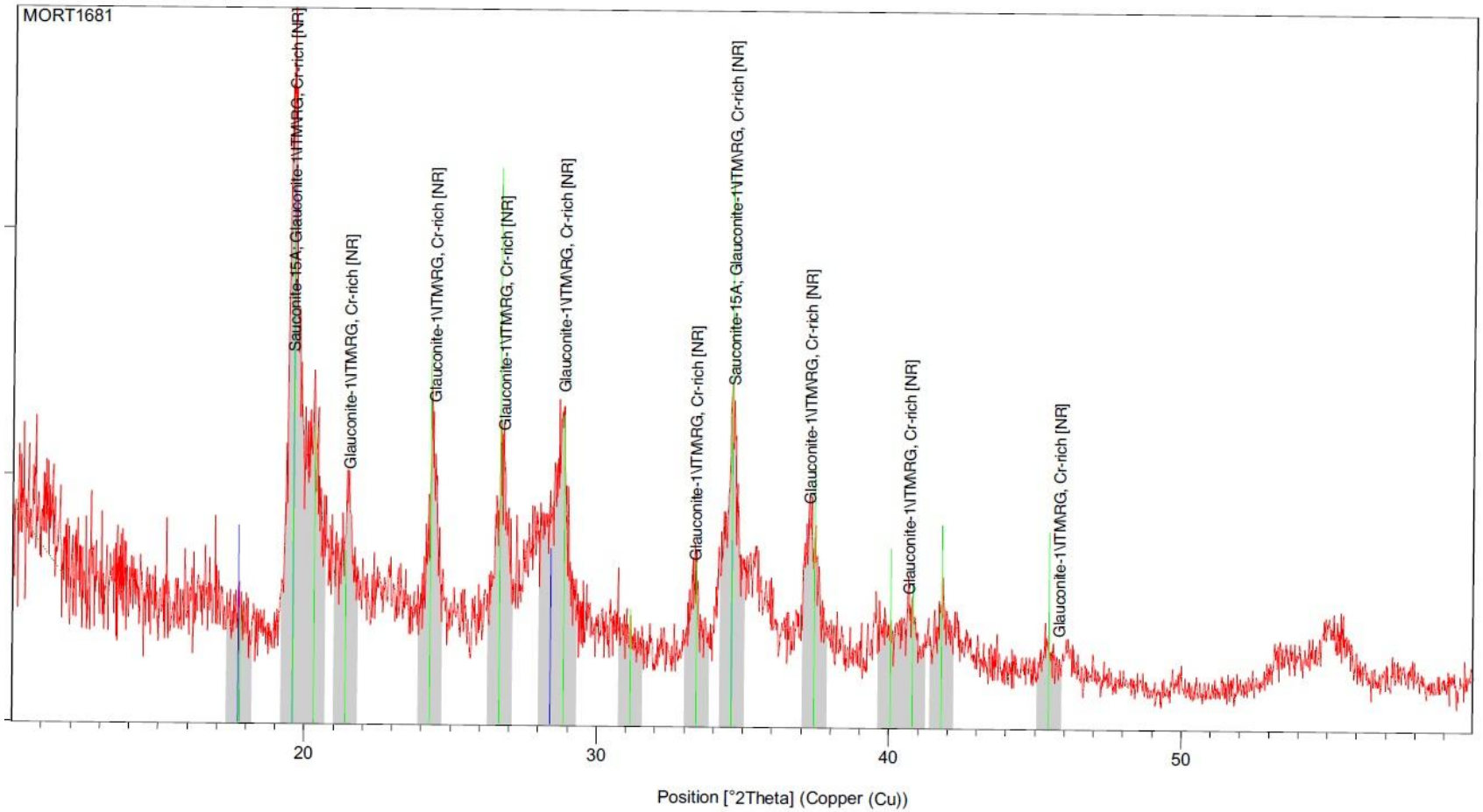
Most geologists and petrologists don't care much for the mineralogical definitions [of clay minerals] and, as Alfredo indicates, call a green mica either glaucosite or celadonite based on whether it's in a sedimentary or igneous rock.

### Frank K. Mazdab

...glaucosite (the ill-defined family) is really just celadonite (the composition space) with a K-deficiency...

...there's nothing officially defined below [ $K < 0.5$  APFU] ... and certainly not all the way down to 0.2 *apfu*. That would typically be the realm of chlorites, vermiculites and smectites. Note that the 0.3 *apfu* Ca in saponite is just an interlayer cation, and so could conceivably be replaced by 0.2 to 0.3 *apfu* K for a "K-saponite" (or a "K-ferrosaponite")

A PXRD analysis was obtained from John Attard  
Suggests Glaucosite or Sauconite (Suaconite is a zinc mineral)

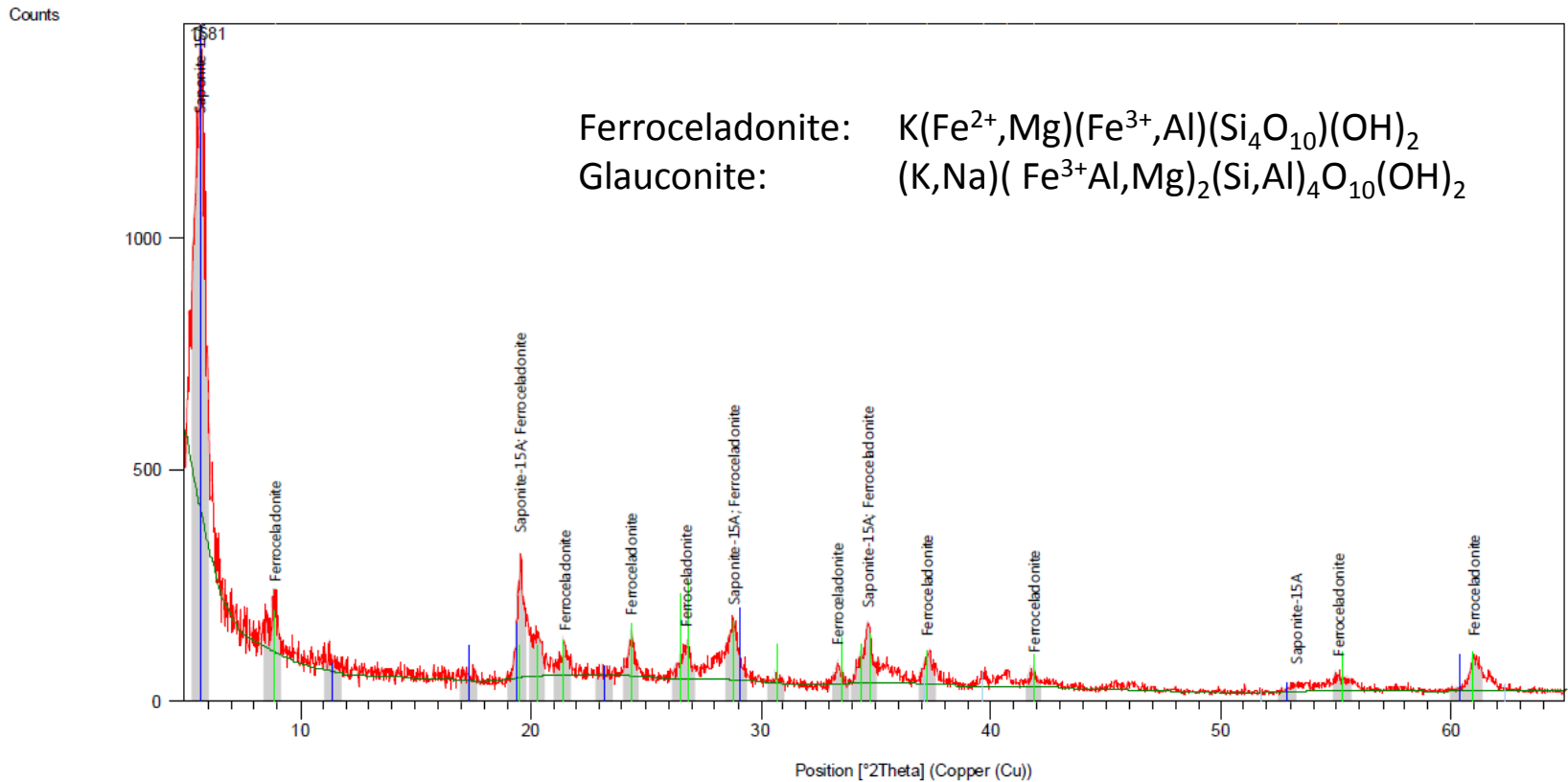




Second PXRd , extended range. Suggests Ferroceldonite or Saponite  
 Saponite is a smectite group (clay-like) mineral that requires Mg.  
 Ferroceldonite and celadonite are also mica group minerals, isostructural  
 with glauconite.

Sample Identification

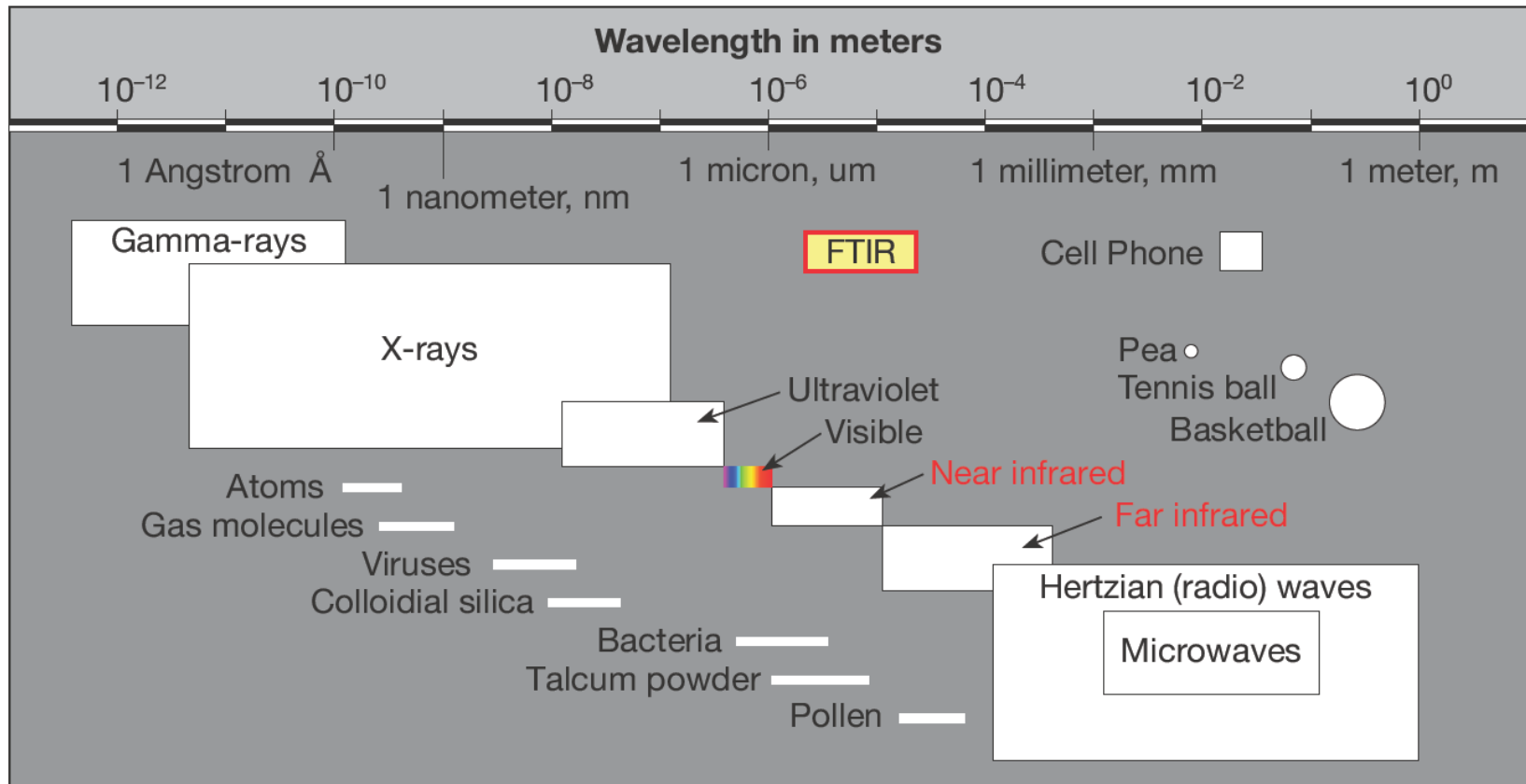
1681



Through my [mindatnh.org](http://mindatnh.org) web site, I was contacted by a California mineral researcher, Don Kasper, offering to do FTIR analysis on my glauconite.

**FTIR** : Fourier Transform Infra-Red spectroscopy.

FTIR uses an infra-red “light source” from a laser as a stimulus



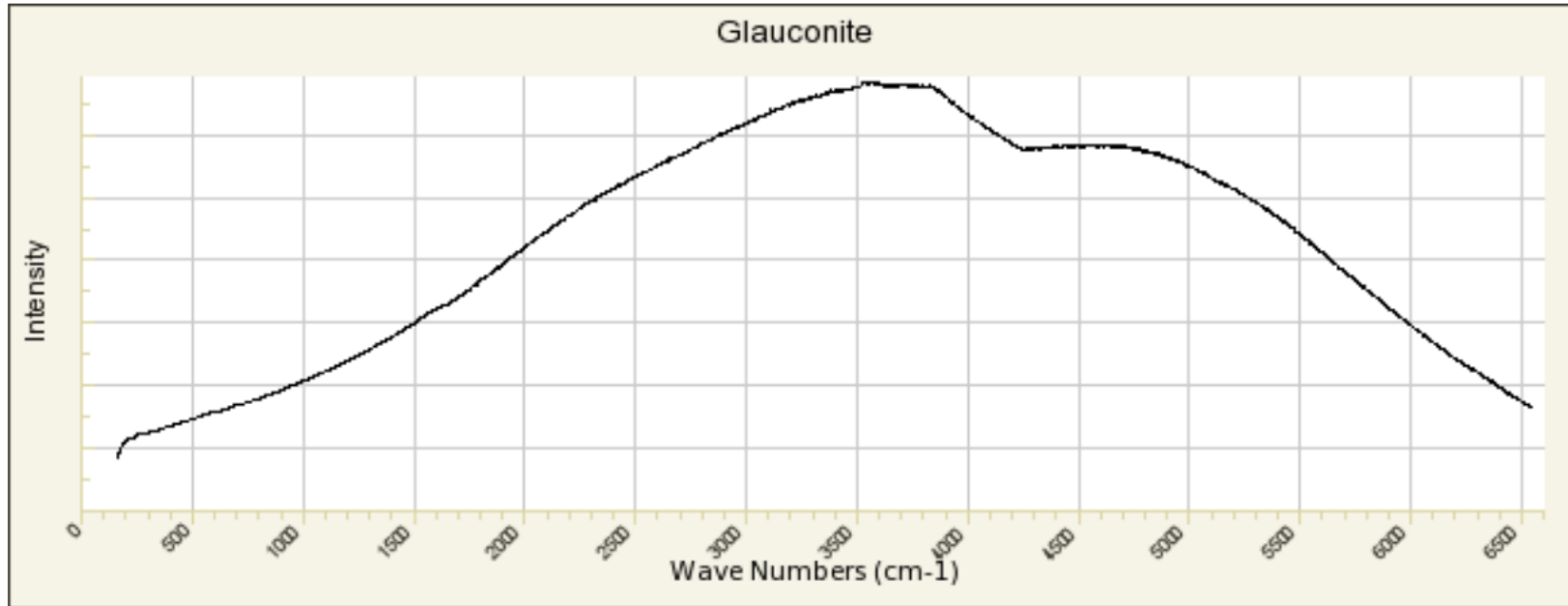
The FTIR spectrometer shows us as a graph of the intensities of infrared energy reflection (the fraction of each wavelength that was not absorbed) as a function of wavenumber. By comparing the infrared spectrum of an unknown mineral to the infrared spectra of known minerals (standards), we will be able to identify many unknown minerals. In other words, we can use the FTIR spectrometer to identify minerals.

**RRUFF ID:** R070295

**Wavelength:** 532 nm ▼

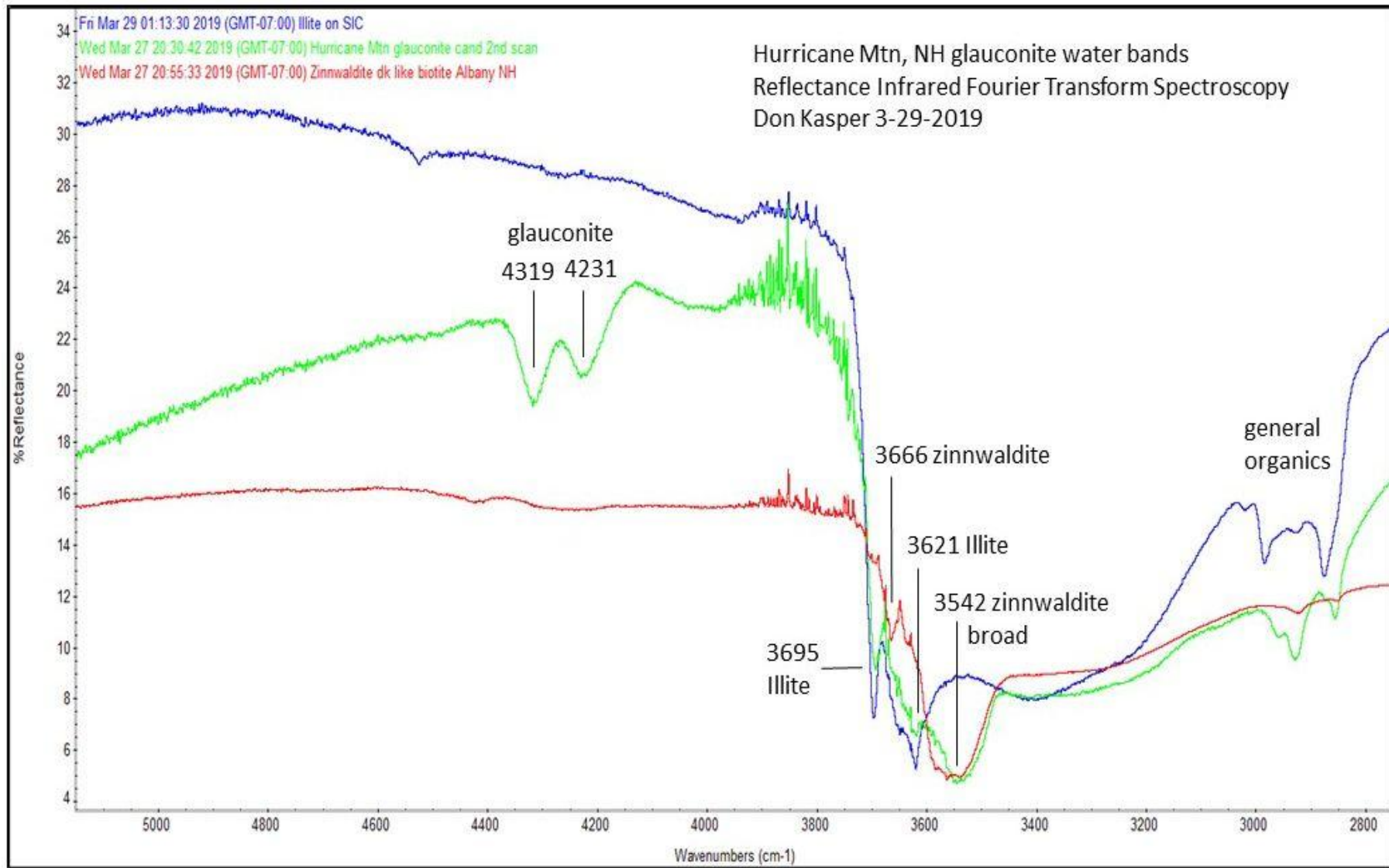
**Description:** Unoriented sample

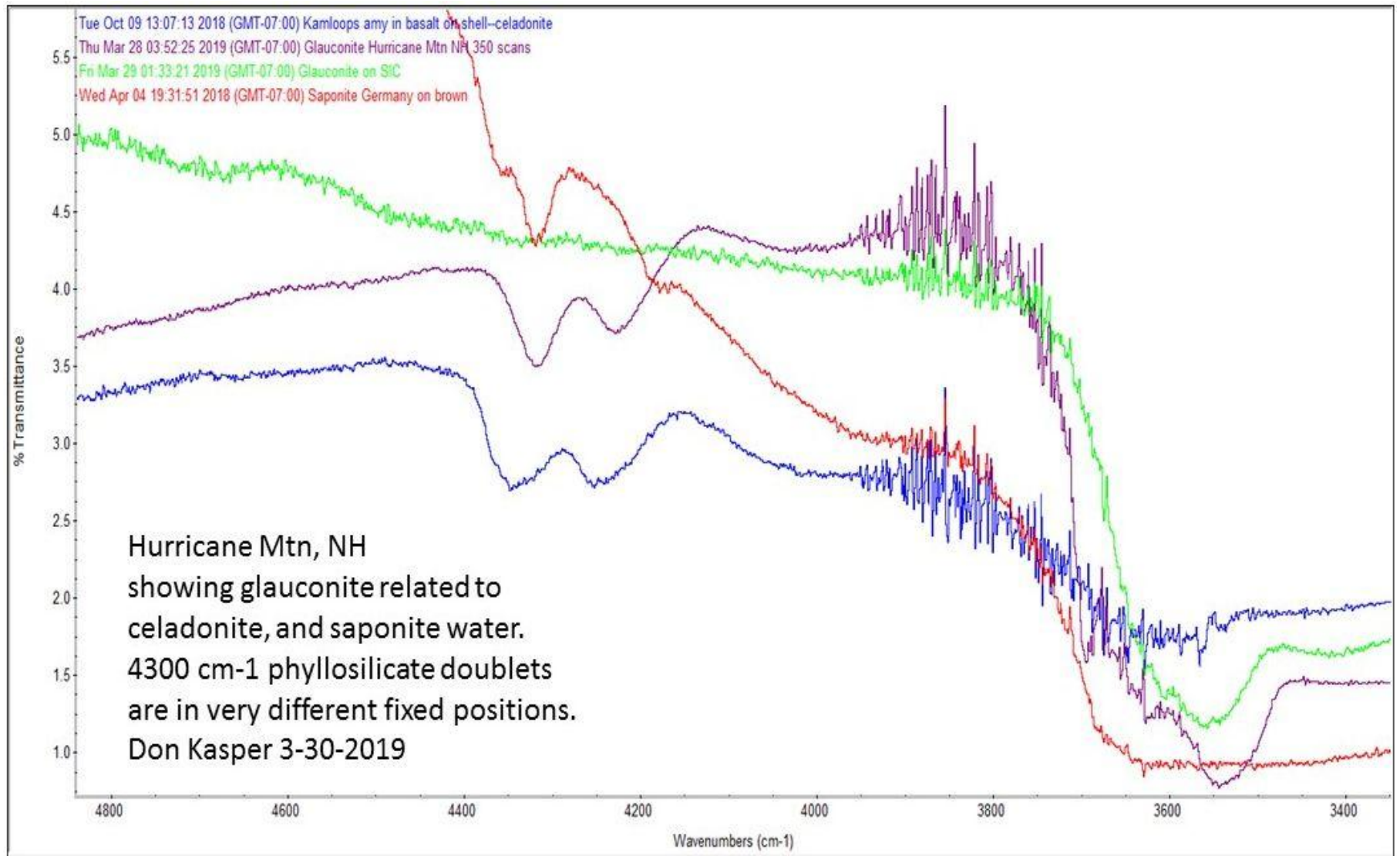
**settings:** Thermo Almega XR 532nm @ 100% of 150mW

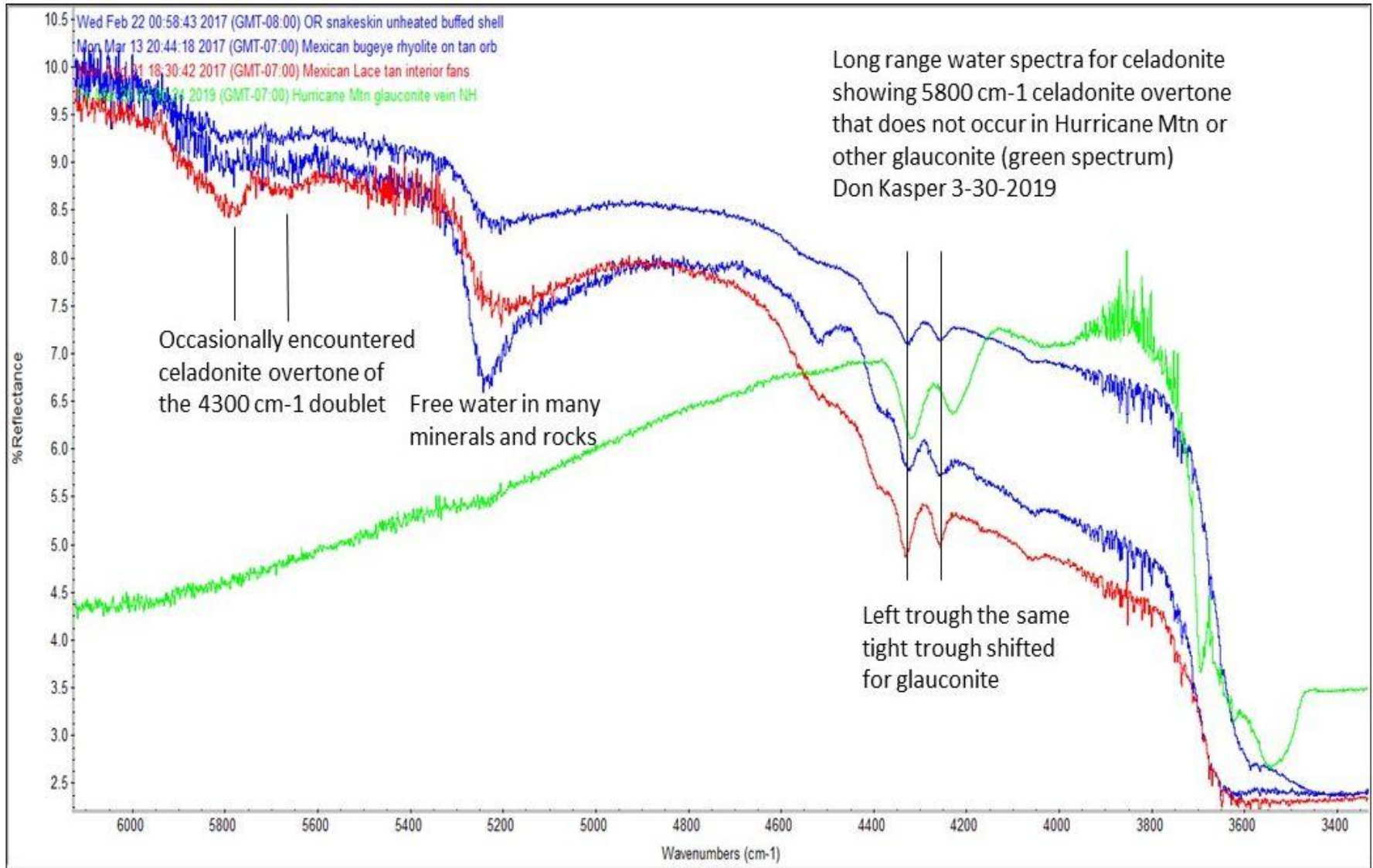


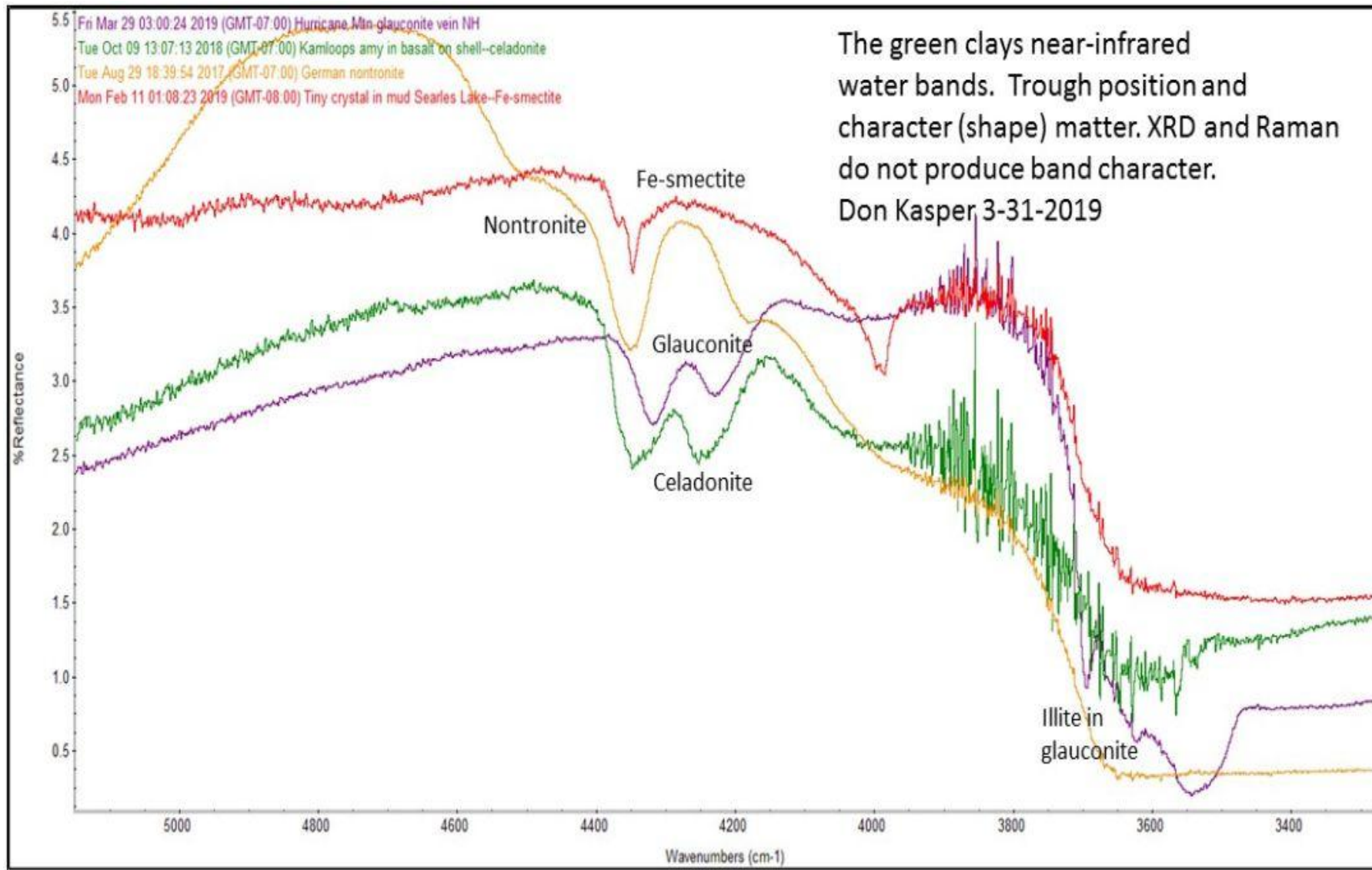
**What does RRUFF stand for ?**

**R**aman **R**esearch **U**sed **F**or **F**un is the rumor, but Michael Scott who financed the project to get it going had a cat called RRUFF.











# FINAL THOUGHTS

- There is substantial controversy in the species definition for many clay minerals.
- My conclusion: Glauconite is as good as any species definition for this Hurricane mineral.
- If collectors continue to use this label, at least we will all know to what is being referred.