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The Mineral Collector's Newsletter

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A New Find of Fluorescent Sodalite
From Michigan's Upper Peninsula

Raymond Laughlin
513 Iron Street
Norway, Michigan 49870

Shawn M. Carlson*
245 Jule Lake Road
Crystal Falls, Michigan 49920
shawncarlson@hotmail.com

Travis A. Olds
Washington State University
School of Mechanical and Materials Engineering
Sloan Hall Room 201
Pullman, Washington 99164

Owen P. Mills
Applied Chemical and Morphological Analysis Laboratory
Michigan Technological University
1400 Townsend Drive
Houghton, Michigan 49931

Back in January 2018, it was brought to the attention of one of us (RL) that a gentleman named Erik Rintamaki was selling pebbles and cobbles of fluorescent syenite that he had collected along the Lake Superior shore in Luce and Chippewa counties of Michigan's Upper Peninsula, marketing them under the unofficial name "yooperlites" For those who may be unfamiliar with our geography, denizens of Michigan's Upper Peninsula are colloquially known as "Yoopers", a corruption of the abbreviation "U.P " for Upper Peninsula—ergo *yooperlites*. Apparently, the fluorescent mineral in these syenites had been visually identified as sodalite by California geologist and fluorescent mineral collector Gabe Reyna. Salting in some details of the discovery provided by Mr. Rintamaki:

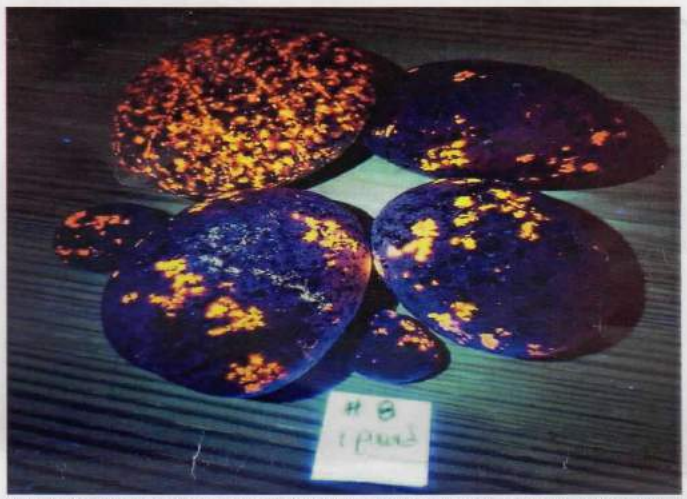

Fig. 1: A collection of "yooperlites" (syenite clasts containing fluorescent sodalite) collected from Lake Superior beaches in Chippewa and Luce counties, Upper Peninsula of Michigan. No dimensional scale but these specimens collectively weigh about one pound, as indicated on the paper note. LWUV LED illumination, Erik Rintamaki photograph.

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Concretions

Bob Werner
werner@lcturbonet.com

Concretions are composed of minerals, albeit rather ugly for the most part, but they are often fascinating and curious stones, some of which still defy explanation. I suppose collecting concretions is a legitimate branch of "mineral collecting", although I know very few mineral collectors that would go out of their way for an ugly concretion. So over the years I have delved into the world of concretions on my own, carefully hiding them in a closet lest I be discovered by other mineral collectors!

The Wikipedia definition of concretion is pretty straightforward: *"A concretion is a hard, compact mass of matter formed by the precipitation of mineral cement within the spaces between particles, and is found in sedimentary rock or soil. Concretions are often ovoid or spherical in shape, although irregular shapes also occur The word 'concretion is derived from the Latin con meaning 'together and crescere meaning 'to grow Concretions form within layers of sedimentary strata that have already been deposited. They usually form early in the burial history of the sediment, before the rest of the sediment is hardened into rock. The concretionary cement often makes the concretion harder and more resistant to weathering than the host stratum."*

It's interesting to note that not a lot appears in the popular literature about concretions. You won't find them mentioned in mineralogy texts and I can't recall seeing anything significant about them in geology texts either I tried a number of different names in Mindat.org relating to well-known concretions and they all brought up the error message. So, to find information on concretions takes a little detective work and digging. There is a lot of rather obscure information out there on concretions.

Dr William B. Sanborn wrote a book titled "Oddities of the Mineral World" that was published by Van Nostrand Reinhold in 1976, in which he discussed a number of different concretions. A search of the internet today using either "concretion" or the name of a specific type such as "septarian" will bring up quite a number of articles and research papers on the subject. Their formation processes are so varied and often complex and their physical form often so unusual that I am a little surprised that more attention hasn't been paid to them by collectors. (Continues on page 4)

Fluorescent Michigan Sodalite

(Continued from page 1)

"I have a little story that goes with my discovery About 15 years ago I taught my brother-in-law Jason Klein how to find agates on the shores of Lake Superior north of Newberry .and he took to agate picking like no one I've ever seen. He became a rock hound just like me. Well he stumbled across some literature from the Fluorescent Mineral Society about UV lights. And we always dreamed about hitting our beaches at night and seeing the beach turn into a world of fluorescing stones and minerals. So fast forward 15 years and I happened to be on eBay and saw an affordable longwave UV flashlight. So on a whim I ordered one. So in June of 2017 I left for the beach at 4:00 a.m. I got to the beach just in time to use my cheap 3 LED longwave UV flashlight and found 2 very small Yooperlites about the size of a dime. I went 4 more times and only found half a dozen stones. Then I upgraded to a 100 LED UV torch and that's when the fun began in the fall of 2017 My largest find so far was over 5 pounds. Now I have upgraded even further to Convoy S2+ UV and a shortwave lamp. So I hope to open even more secrets of our Lake Superior beaches."

– E. Rintamaki, written comm., February and March 2018.

Fig. 2: Close-up of fluorescent sodalite. LWUV LED illumination, FOV approximately 4.0 mm, Travis A. Olds photograph. Although the fluorescent intensity of this Michigan sodalite is best described as moderate when illuminated by older-model Hg-vapor sources like the well-known portable 6-watt Mineralight® lamp, the fluorescence is quite brilliant in response to modern powerful multi-LED ultraviolet flashlights.

To our knowledge, sodalite has not been reported from Michigan before; no mention of it is made in The Mineralogy of Michigan (Heinrich, 1976), Mineralogy of Michigan by E. Wm. Heinrich (Robinson, 2004), or in Mineralogy of Michigan Update (Robinson and Carlson, 2013). In order to study this occurrence further, our research team purchased several kilograms of sodalite-bearing syenite from Mr Rintamaki for analysis. Upon receipt, we observed that the clasts do indeed resemble syenite at first glance and most likely are; however, we note here that we have not conducted any whole-rock analyses to classify these rocks chemically (TAS) nor have we performed any thin section point-counts to classify them via modal mineralogy, as our primary interest is with the fluorescent sodalite and not with formal igneous rock-type classification. Expressed differently, all or most of these rocks are probably some type of syenite but we have not performed the necessary tests to confirm this.

Mineralogy

The mineral reported as sodalite does indeed display a strong hackmanite-like fluorescence in response to longwave UV illumination (Figures 1 [on page 1] and 2). Examined under incandescent illumination and binocular stereozoom microscope, the mineral is generally a very pale gray but hints of yellow and teal are observed. And it is translucent, although this is probably due to heavy fracturing, as small unfractured domains appear transparent. Examined via petrographic microscope the material possesses a refractive index between 1.480 and 1.490 (consistent with sodalite) and appears isotropic in crossed polars (Figure 3).

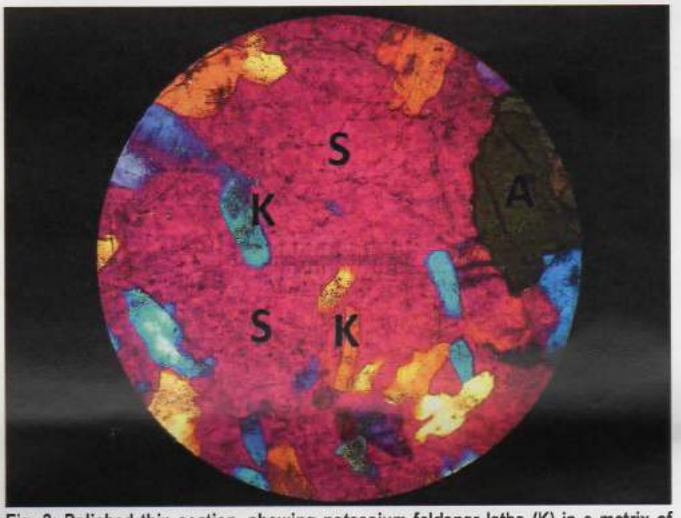

Fig. 3: Polished thin section, showing potassium feldspar laths (K) in a matrix of isotropic sodalite (S) with minor undifferentiated amphibole (A). Tiny inclusions within amphibole are a mix of "apatite" and nepheline (WDS-verified), another mineral never officially reported from Michigan before now (Carlson and Olds, in prep). Crossed polars with gypsum accessory plate; FOV 1.5 mm. Shawn M. Carlson photograph.

Preliminary SEM/EDS analyses conducted at Michigan Technological University showed only Na, Al, Si, Cl and O in the mineral's spectrum. Sulfur was sought but not noted with EDS (below detection limits) but was detected by follow-up EMP/WDS, which yielded a composition of: 36.47 wt.% SiO_2, 30.84 wt.% Al_2O_3, 25.39 wt.% Na_2O, 0.31 wt.% FeO, 0.05 wt.% K_2O, 7.02 wt.% Cl, and 0.11 wt.% SO_3 (average of three very similar analyses). Microscopic studies were conducted using a Kyowa SDZ-P binocular stereozoom microscope and a Kyowa ME-POL2 petrographic and ore microscope equipped with a Supper spindle stage. EDS spectra were obtained at Michigan Technological University on a JEOL 6400 tungsten-source SEM equipped with a 4pi Analysis (Inc.) ultrathin window EDS detector and operated at 20 kV WDS analyses were provided by the Saskatchewan Research Council on a Cameca SX-100 LaB_6 microanalyzer operated at 20 kV, using standards from Astimex Standards (Ltd.)

We therefore concur with Rintamaki and Reyna that this fluorescent mineral is indeed sodalite, and that this is the first verified sodalite documented from the state of Michigan. Our congratulations and thanks to the discoverers for bringing this find to our attention.

(Continues next page)

Although no mention of syenite is made in Susan Robinson's artistic study *Is this an Agate? An Illustrated Guide to Lake Superior's Beach Stones Michigan* (Robinson, 2001) it has been our experience that syenite clasts are not that rare in Michigan, and can be found along many Lake Superior beaches as well as in gravel pits within Upper Michigan's interior Perhaps this clast lithology has been traditionally underestimated because of it being misidentified as granite and thus dismissed by collectors as not very interesting. Although there are some small syenite bodies in Upper Michigan's Marquette County, to the west of this study area, we believe that it is unlikely that Rintamaki's sodalite-bearing syenite clasts are locally-sourced. It is more probable that the bedrock source of this material is located in Canada, specifically the Coldwell Alkaline Complex in Ontario, and that fragments of this complex were transported to their approximate present-day location by continental glaciation, further slightly moved, concentrated, and somewhat wave-polished by modern Lake Superior. Indeed, the presence of minor orange-red natrolite (alteration of nepheline) in these clasts argues strongly for a Coldwell Complex origin (Mitchell and Platt, 1982).

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Approximately 187 valid mineral species were known to occur in Michigan in 1976 when Heinrich published the first edition of our state's geographic mineralogy Today, there are about 383 minerals known in Michigan, more than double. Yet despite this obvious advancement, the fact that discoveries like this fluorescent sodalite can still be made—a mineral not previously confirmed in Michigan, but now known to occur in kilogram quantities along Lake Superior beaches—suggests that the mineralogy of our state is significantly under-studied, and that hundreds of minerals new to Michigan (plus possible brand new species for the world) await discovery here. We warmly encourage future collectors and researchers to go out and discover them.

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