

# Fluorescent Minerals of the Ilimaussaq Complex, Greenland



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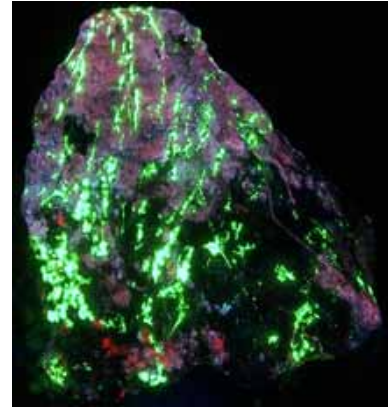
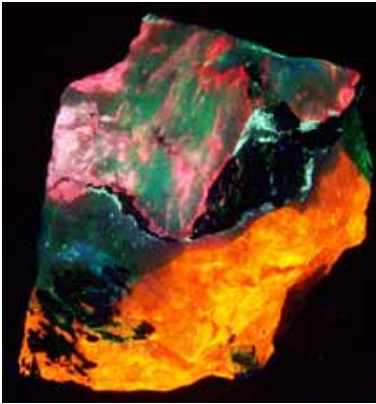
*This is a "glowhound's" summary of rocks and minerals found within the Ilimaussaq Complex. Every attempt (within a hobbyist's means) was made to verify the identification of each mineral. Pictures were taken using a Kodak DC4800 and plentiful UV light - all photos are unretouched except for cropping and background cleanup; colors are replicated as closely as possible given the constraints of digital cameras, digital printing and color mixing (as well as human perception of colors). Further research by more qualified individuals will result in much more useful studies; this is only a "hobbyist's teaser" to the excellent scientific articles yet to be published.*

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11/29/03

## Fluorescent Minerals of the Ilimaussaq Complex, Greenland

**Franklin, New Jersey USA** – Most fluorescent collectors started out collecting Franklin minerals. They are among the brightest and most sought after fluorescent minerals known to the hobby. Miners discovered the amazing fluorescent properties of many minerals from the Franklin, NJ mines 100 years ago. Throughout this last century, scientists such as Charles Palache, Clifford Frondel, Pete Dunn and others have studied the mineralogy of the NJ mines and slowly identified each mineral. Mineral collectors have explored the fluorescent properties of these minerals for years. Even today new minerals are being identified!



**Ilimaussaq Complex, Greenland** - The Ilimaussaq complex in Southern Greenland has been a famous center for geological exploration for hundreds of years. As early as 1806 mineralogists were exploring the unique geology of the complex; since then over two hundred minerals have been identified within the intrusion. Many are only known from a few areas in the world, and at least ten are unique to Ilimaussaq. The complex is also the type locale for dozens of species.

.....**But**

***Greenland's fluorescent minerals have largely been ignored!***

Until 2000, only tugtupite was recognized as a significant (and very rare) fluorescent mineral from Greenland; some collectors were aware of fluorescent sodalite but little was available on the open market. Over the past three years remote areas of the complex have yielded scores of fluorescent varieties of tugtupite, sodalite, sorensenite, polyolithionite, and ussingite. Many unidentified minerals have been found -- but make wonderfully glowing rocks!

Fluorescent collecting in the Ilimaussaq complex can probably be equated to the 1950's around Franklin. Imagine the first collector who discovered the fluorescent properties of margarosanite! The excitement of discovering and collecting these new minerals, from an entirely new locale, adds a valuable new dimension to the fluorescent mineral hobby. A few knowledgeable people have picked up on this new material and are slowly and methodically analyzing them. Many of the Greenland minerals found today will ultimately be identified, some will be common and perhaps others will be excessively rare -- but all are welcome additions to the hobby.

Today, there are over 15 separate fluorescent minerals identified from the complex, and scores waiting to be identified. The brightness of these pieces, along with many beautiful multi-color combinations, rivals those from Franklin. Many pieces exhibit dramatic phosphorescence or a remarkable tenebrescence (color change) found in few other minerals. No literature exists describing the fluorescence of the various minerals within the complex; few people have even brought a UV light to the area! Yet these minerals simply lie there – waiting for

the venturesome collector to shine a light on them and find the hobby's next rarity! Fluorescent collecting in Greenland must be akin to collecting in Franklin in the old days; exciting, productive, and simply fascinating.

## Greenland

Greenland, an island covered in ice (albeit, the world's largest), has a rugged coastline with strips of green in the summer months (Erik the Red named it Greenland after he was booted out of Iceland – the ultimate deception people say. He did it just to make others want to move with him!). Southern Greenland is “warmed” by the Gulf Stream and in the short summer months (June to September) averages in the 50's to 60's. But even during these “warm spells” one is amazed at the majestic icebergs floating in all the harbors and fjords, the glaciers, and the lingering snow covering that elusive piece of tugtupite.

Greenland was very much a part of Denmark until 1979 when a “Home Rule” Government was established, insuring that the culture and Greenland way of life would not be lost. Denmark still plays a major role in Greenland's government, but the Greenlandic people control their destiny. They are a proud, self-sufficient people. Living off the land, they are great hunters and fisherman, and very proud of their natural resources. Greenland is one of the few undeveloped natural wonders left on earth one can visit and still experience nature's beauty and solitude at her finest – without a single worry about terrorism, violence, or crime.



There are no roads connecting the cities (in fact, there are few cities). The larger settlements have roads in town, mostly so people can drive down to their boats – the main mode of travel. Flying into Narsarsuaq (a bustling airport town of 200 people) one can travel by ferry or private boat to Narsarsuaq – home base for those exploring the Ilimaussaq

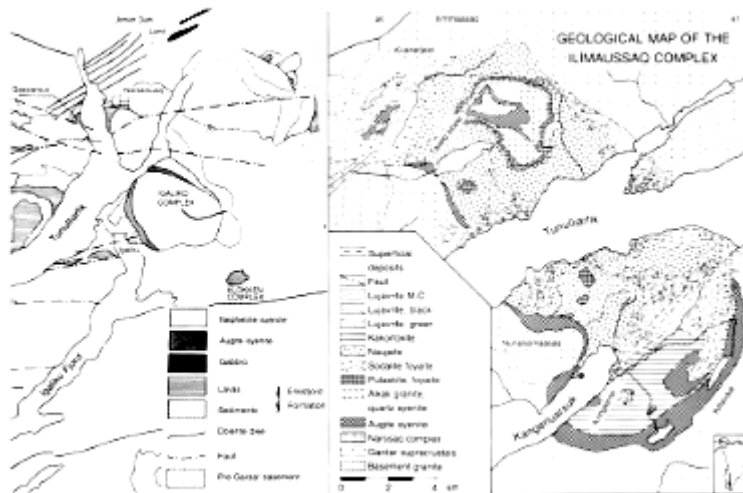
Complex. Narsarsuaq is a small village located about 16km outside the Ilimaussaq Complex. The people are used to geologists traveling there from all over the world. Travel to/from the various areas within the Ilimaussaq complex is by boat or 4-wheel drive truck. An old road leads to the famous Kvanefjeld area (Tugtupite mines) and the Taseq slopes. Other parts of the complex are accessible only by boat.

## The Ilimaussaq Complex



The Ilimaussaq Complex in Southwestern Greenland is an 8x17km intrusion spanning two fjords - Kangerluarsuk fjord and Tunulliarfik fjord. Located near the city of Narsaq, access to certain parts of the complex (Kvanefjeld and Taseq) can be made by foot, while other areas (Kangerluarsuk and Tunulliarfik) requires travel by boat. It is without a doubt the most mineral-rich area in Greenland. Due to the rapid weathering of the friable (brittle and easily crumbled) syenites most of the mountains have no vegetation (no soil). The gray “rockscape” contrasts sharply with the deep blue fjords and gleaming white icebergs.

The 1.2 million year old intrusion consists of three different rock suites. Nepheline-bearing augite syenite first formed a shell along the sides and the roof, next a quartz bearing alkali granite and alkali syenite formed two thin sheets near the top, and finally the biggest part and center of the intrusion was formed by a layered series of under-saturated syenites. These three main rock suites represent three pulses of different kinds of magmas. The rocks close to the roof are the oldest. The most common rocks in these areas are a sodalite-nepheline syenite called naujaite, an arfvedsonite-aegirine bearing nepheline syenite called lujavrite, and a eudialyte-bearing nepheline syenite called kakortokite.



**Geological map of the Ilimaussaq Complex** – based of a map by Ferguson (1964) and since corrected and improved.

Ilimaussaq hosts the widest variety of minerals in Greenland - more than 200 so far, half of them silicates. The silica content of these minerals is much higher than elsewhere in the world. Numerous pegmatites and hydrothermal veins, streaks and patches are found all over the intrusion, but are most common in the areas of Kangerluarsuk and Kvanefjeld.

There are several key localities within the complex. Some of these areas are small intrusions perhaps only meters wide. Many minerals in these areas are found nowhere else in the world.

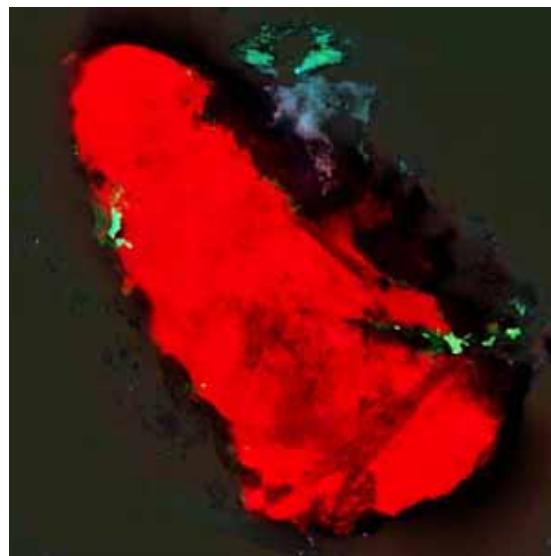
Each area within the Ilimaussaq Complex yields distinctly different varieties of the more commonly found minerals. Therefore, a discussion of each variety found in each of the four major areas (Kvanefjeld, Taseq Slopes, Tunulliarfik, and Kangerlussaq) is appropriate.

### **Kvanefjeld**

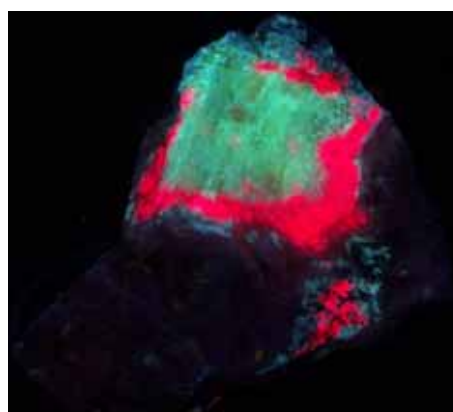
Kvanefjeld Mountain (700m) is located at the NW corner of the Ilimaussaq Complex. An old mining road crosses the 15km from Narsaq to the valley between Kvanefjeld and the Taseq Slopes. This road gradually climbs 300 meters and then becomes impassable. It is then a nice hike up to the 500 meter level via an old mine access road to an (abandoned) uranium mine. From this point a "trail" leads to the summit of Kvanefjeld, "rock climbing" the last 200 meters. The difficulty is average and not particularly difficult if you are in reasonable shape. The vertical slope is gradual, and mainly consists of following a well-worn trail, while climbing over large pieces of sodalite and lujavrite.

Atop Kvanefjeld one is greeted with a wonderful view of the valley below, Narsaq in the distance, and the iceberg dotted fjords. It is easy to spend the entire day exploring the relatively flat areas at the top, and digging through the years of tailings that the locals have amassed while searching for gem red tugtupite. The main tugtupite mining area is located a short walk to the west and is littered with snow-white pieces of albite and analcime (many actually are white tugtupite). Most pieces glow bright red under SW UV. Occasionally one will meet a local miner pounding away at a white vein in an effort to pry loose some bright red "tutupit". In recent years gem tugtupite has become quite scarce. Over the 2003 summer season very few pieces were found, bringing the cabochon industry to a virtual halt.

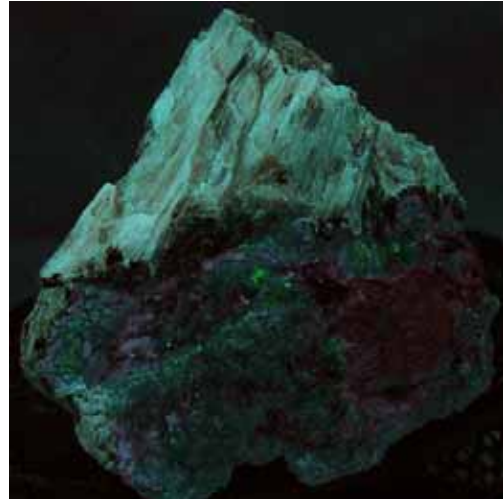
## Kvanefjeld Minerals



**Tugtupite** – The tugtupite from the Kvanefjeld area is the most widely known fluorescent mineral from Ilimaussaq. It is typically a bright gemmy red and is the source for the gem material used in making beautiful tugtupite cabochons. A typical piece of gem tugtupite will be found in an analcime and lujavrite matrix, probably along with aegirine crystals. The natural color ranges from a light pink to a deep cherry red. Under shortwave the red glow is unmistakable. Commonly associated (fluorescent) minerals include chkalovite, beryllite, and sorensenite.

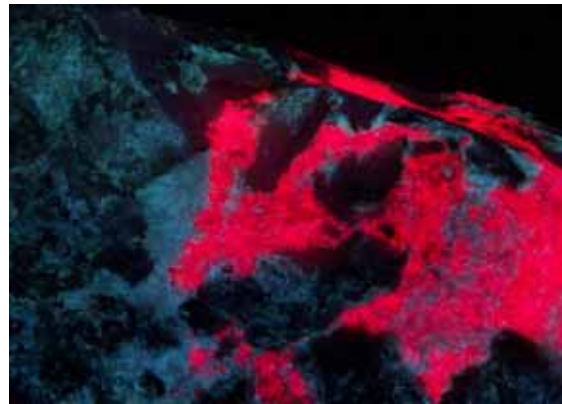


**Chkalovite** – Chkalovite was one of the first of the beryllium minerals to form in the intrusion. Tugtupite is often found replacing chkalovite and the resulting specimens can be found throughout the complex. The ones from the Kvanefjeld area often glow a brilliant green. Massive crystals of green fluorescent chkalovite have been enclosed in circles of brilliantly red fluorescent tugtupite – resulting in a spectacular fluorescent. Chkalovite is usually associated with many of the rare minerals in the complex and is a good indicator of the presence of other minerals - such as ussingite, tugtupite, and sodalite.



**Sorensenite** – A single locale mineral, only found within the Ilimaussaq Complex. White to pale pink bladed crystals fluoresce a yellow/white under SW UV (medium intensity). Large aggregates on a lujavrite/analcime matrix have been found in the Kvanefjeld area. Most spectacular are the very rare specimens of tugtupite and sorensenite combined.

**Sodalite** – The sodalite from the Kvanefjeld area is (to date) unremarkable with only a couple of exceptions. Typically it appears to be of a coarser texture (very few pieces of pure sodalite – usually mixed with aegirine and syenite). The fluorescence is a duller orange than those found in other areas of the complex. A blue sodalite was recently found which, while not impressive as a fluorescent specimen (similar to those from Mt St Hilaire in brightness), the tenebrescence is quite remarkable.



**Beryllite** – One of the minerals thought to be responsible for the varied unusual fluorescent responses of the Ilimaussaq finds is Beryllite. Most often it is found as a soft, white chalky encrustation on pieces such as tugtupite, fluorescent a medium intensity gray/white. Since beryllium is undetectable by EDS, verifying the presence in various minerals has proven a challenge.

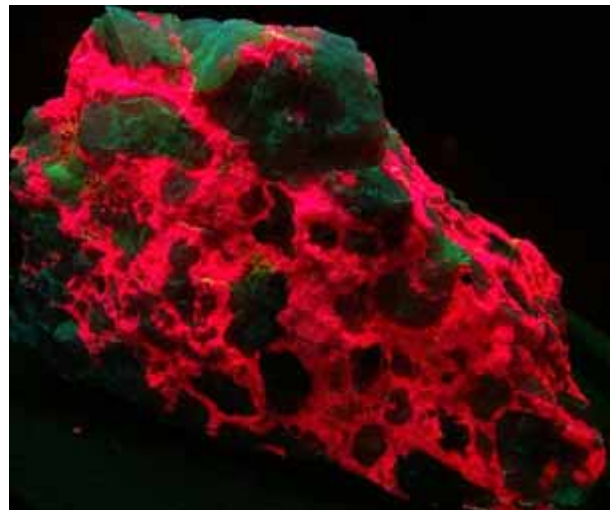
## Taseq Slopes

A valley separates the Kvanefjeld area and the Taseq Slopes. The Taseq Slopes are expansive, running the entire width of the middle of the complex. Towards the bottom of the slopes there are large boulders that have eroded from the cliffs above. Climbing up, pockets of sodalite, white veins of albite and analcime, and outcroppings of a myriad of other minerals can be observed. Veins within the lujavrite rocks contain fluorescent minerals like sodalite, ussingite, tugtupite, polyolithionite, and others.

Tenebrescent gem quality sodalite is often found on the slopes. Tenebrescence is the “color change” caused by exposure to ultraviolet light (usually shortwave). Both tugtupite and sodalite exhibit this characteristic in varying degrees throughout the complex. One important note of interest: freshly split rocks will often initially show a deep purple color, which quickly fades. While similar to tenebrescence, this is usually a “one-shot” occurrence. It never happens again (unless the mineral happens to be a tenebrescent sodalite or tugtupite). But it is often a good indicator of fluorescence.

There are three areas of interest on the Taseq Slopes: the eastern slopes, middle slopes, and western slopes. Only the western slopes have been extensively surveyed (by H. Sorensen and others in the mid 60's). This area is noted for the heavy concentrations of beryllium, and produces some fantastic specimens. The middle slopes and eastern slopes both produce great examples of sodalite and tugtupite, along with a myriad of unidentified species.

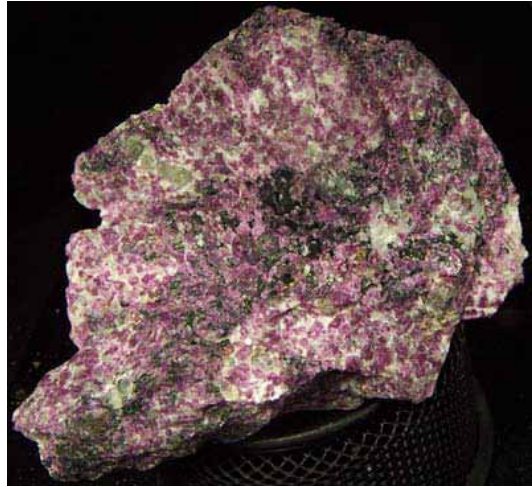
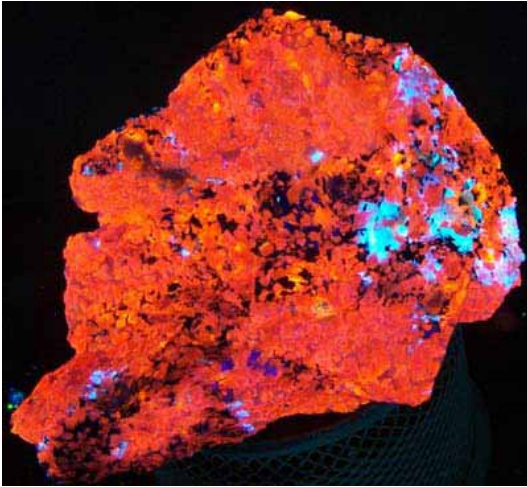
## Taseq Minerals



**Taseq Tugtupite** – Found both in boulders that have rolled to the bottom and in veins towards the top of the slopes, this variety of tugtupite is quite different from that found on Kvanefjeld. It was first found in the summer of 2002. It consists of a coarse grained pink veining in massive crystals of analcime. Often pieces are associated with aegirine (non FL) and what appears to be a spotty green



fluorescent analcime. Many pieces have vugs where micro crystals of tugtupite can be found. Daylight color ranges from a light pink to deep pink, but not yet found in a gemmy red state as on Kvanefjeld. This material is also usually quite phosphorescent.

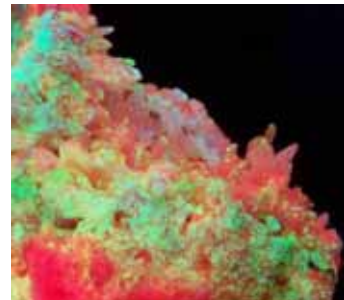


**Sodalite (Glacial Boulders)** – The Narsaq Elv (river) cuts the valley between the Taseq Slopes and Kvanefjeld. As expected, this cut is filled with water worn (and glacier worn) boulders. Many of these boulders are beautifully round pieces of sodalite. When split open they reveal a coarse grained sodalite mixed with a bright bluish/white fluorescing analcime (per EDS). The brightness of the blue/white FL (shortwave) could be easily mistaken for scheelite. Interestingly, this type of material has only been found in the eroded boulders – not in the cliffs above. The sodalite is usually deeply tenebrescent.



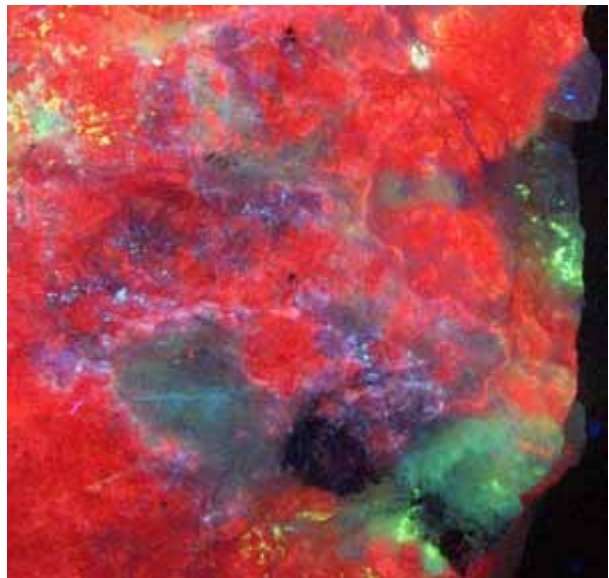
**Tugtupite Crystals** – The rarest fluorescent find to date was made during the MinerShop 2002 Greenland “Geo-Adventure”. One of that year’s tour members found a boulder of tugtupite on the eastern slopes. When he cracked it open he found a cavity of wonderfully formed tugtupite crystals – a true rarity! Many pieces have micro crystals but this piece was

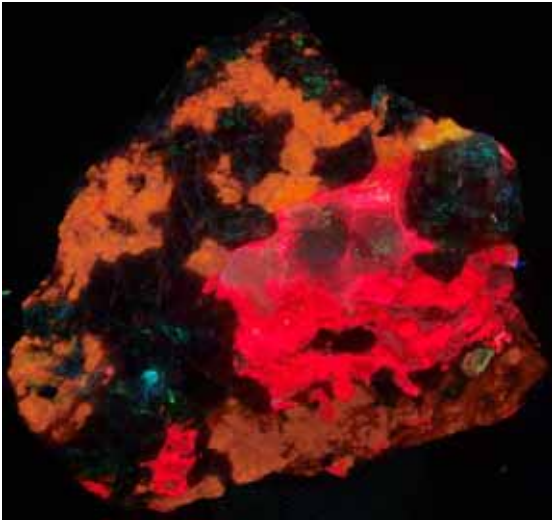
truly remarkable in size. Although not a gemmy red, the tugtupite deepened in color to an intense pink. A coating of what appears to be a uranyl activated green FL covered many areas on the specimens, along with a yellowish glow – perhaps from another associated (unknown) mineral.



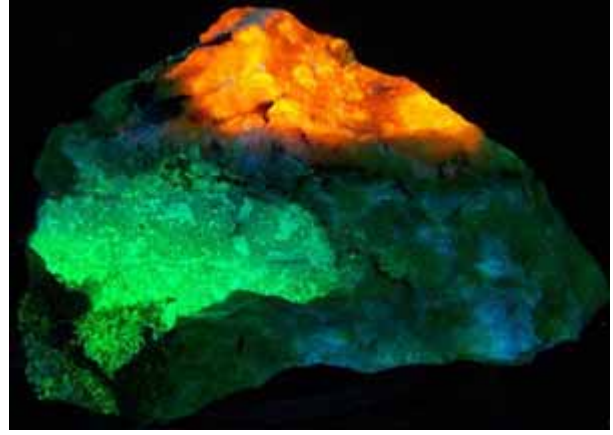


**Yellow Sodalite** – Sodalite is found throughout the complex (probably as common as calcite is on the dumps in Franklin). The finest specimens are gem quality pieces with deep tenebrescence. In the Taseq area a unique variety has been found which appear yellow under natural lighting, distributed in a white albite/analcmite matrix. Upon exposure to shortwave UV the sodalite color deepens to a dark purple – almost black. The resulting contrast of purple against the white matrix offers a striking specimen. Under shortwave these pieces will initially glow a bright orange – only to deepen to a rust color as the tenebrescence sets in. Some, as in the piece shown here, have chkalovite (FL green) and an unknown purple fluorescing (and phosphorescent) mineral associated with them.





**Sodalite and Tugtupite Combination** – Combination pieces of tugtupite and sodalite are rare and only found in a few areas within the complex. One area on the Taseq Slopes offers up some fantastic specimens. Often these pieces also have what appears to be a blue fluorescing analcime (initial EDS results). Careful examination of many of the spots yielding these minerals will show regions of sodalite at the outside perimeter – perhaps with veins of ussingite and polyolithionite. Next will be concentrations of chkalovite and possibly analcime, followed by tugtupite. Some pockets might be only one or two feet across, while others can be huge.



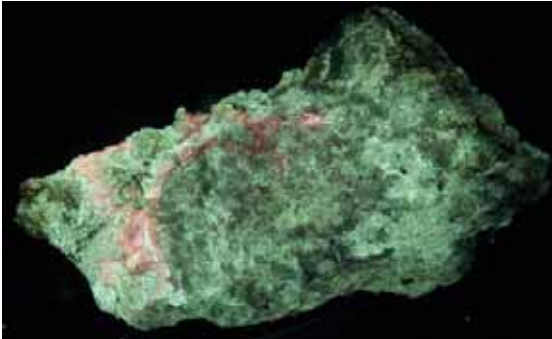
### **Ussingite**

Ussingite is another major mineral found within the complex (of interest to the fluorescent community). It is a fine-grained mineral (similar to quartzite in texture) and ranges in color from white to a deep gem purple. Deeply colored pieces are used for cabochons and can be quite attractive.

The fluorescent properties of ussingite remain a mystery. Many pieces do not fluoresce at all (or very

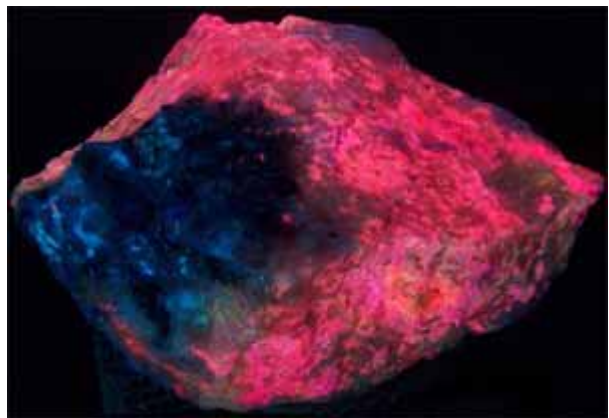


dimly), while others fluoresce orange identically to sodalite. A few fluoresce a brilliant green. Tenebrescent ussingite has not yet been found. Most often ussingite is found associated with chkalovite, polyolithionite, sodalite and tugtupite and is a good field indicator of the presence of these other minerals.



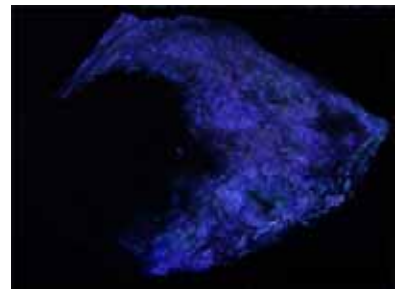
### **Silver Polyolithionite**

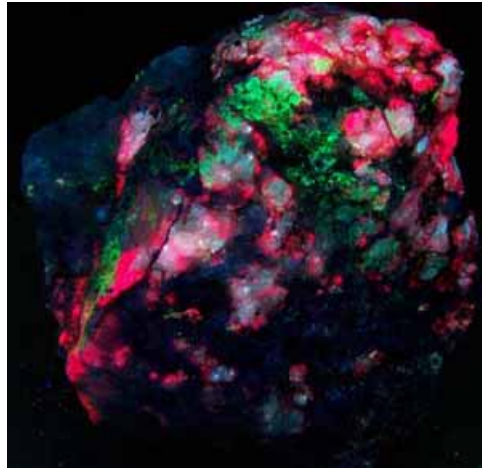
Polyolithionite is typically found as greenish mica plates covering feldspars throughout the complex. On the Taseq Slopes a bright silver variety of polyolithionite is found with fine-grained layers. This variety is as beautiful in natural light and is a brilliant yellow/white under shortwave. Typically the specimens are massive, reaching one meter in diameter, and often associated with tugtupite (which is also quite phosphorescent).



### **Pink FL Tugtupite**

A very unusual variety of tugtupite can be found on the Taseq Slopes. Unlike those found on Kvanefjeld, it fluoresces a bright pink – not the typical cherry red. The response under longwave is also quite remarkable – a bright orange. The natural color is a deep (almost purple) red. In addition, these specimens are dramatically phosphorescent a bluish white. In many pieces tugtupite crystals are found which are clean and well formed (micro). Also, polyolithionite is commonly associated with these specimens.





### **Tugtupite enclosing Chkalovite**

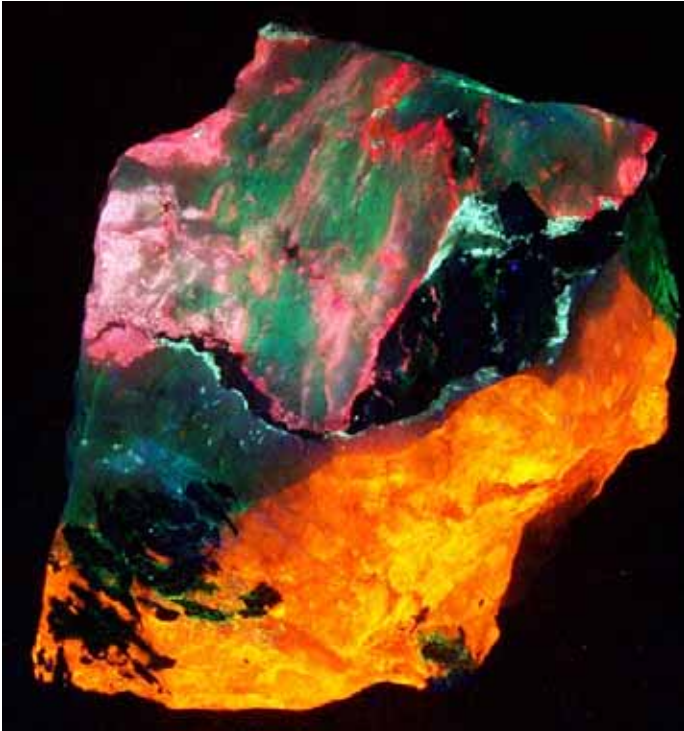
Exceptional specimens of chkalovite (FL blue/green) being replaced by tugtupite have been observed on the Taseq Slopes. These pieces are striking due to the patterns, as well as the very interesting formation. The matrix is analcime and lujavrite; the green FL is unknown but most likely uranyl activated.

### **Tunulliarfik**

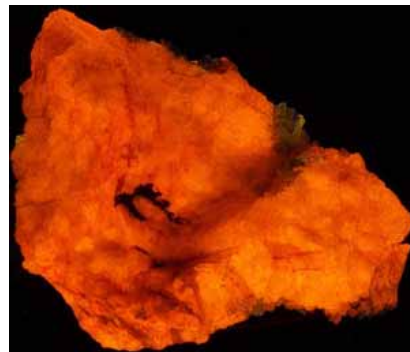
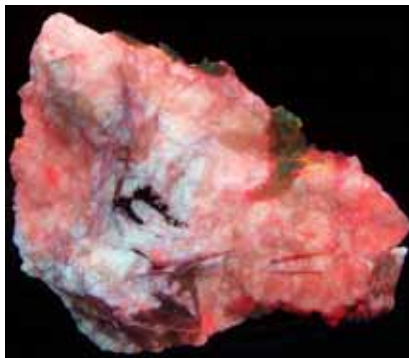
The Tunulliarfik Fjord cuts right through the middle of the Ilimaussaq Complex. Traveling by boat from Narsaq the sights are wondrous; the deep blue water of the fjords broken by massive white and blue icebergs contrasts remarkably to the rocky cliffs and sparse vegetation on either side of the fjord. Upon approaching the transition zone into the complex the appearance of the land changes abruptly. There is almost a complete absence of vegetation due to the rapid weathering of the friable syenites – only gray rocks with an occasional white vein high above. Boulders lie at the water's edge and landslide areas offer up exciting areas to prospect. Gem quality ussingite, massive veins of sodalite, and brilliant assortments of multi-color tugtupite specimens can all be found here.



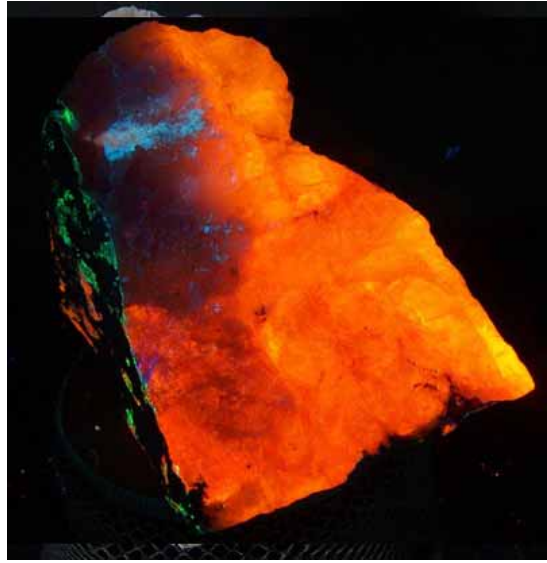
## Tunulliarfik Minerals



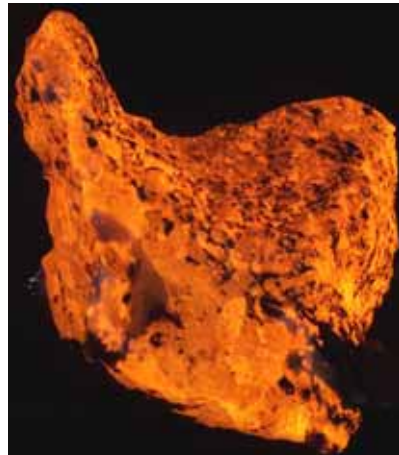
**Ussingite, Sodalite, Chkalovite, Tugtupite and Polyolithionite** – Ussingite seems closely related to sodalite and may even be mistaken for it. The ussingite from the Tunulliarfik area is possibly the best in the complex. Gem quality pieces are found, usually associated with sodalite, tugtupite and polyolithionite - making for a striking 4 or 5 color specimen. One of the mysteries of ussingite is its fluorescence – the response seems to vary from bright orange to bright green to none (or very dim).



**“Tugtulite”** – Tugtup Agtakorfia is a small area right on the water in the Tunulliarfik Fjord. It is the type locality for tugtupite – discovered in 1962 by Sorensen. All of the pink/red tugtupite has since been mined and all that was left in the vein were some remarkable specimens of sodalite and this presently unknown mineral. This material has three distinct color states under each wavelength - bright peach under SW, bright white under MW, and bright orange under LW. Additionally it is extremely phosphorescent a greenish white - lasting for a very long time. EDS analysis reveals that the peach FL mineral is “not a homogenous phase, but rather a mixture of at least two and likely three different phases.” It appears that the bulk of the material is sodalite but the activating agent could not be detected by EDS. Beryllium is part of the chemical makeup of tugtupite and cannot be detected (easily) with EDS. Further research is being conducted on the makeup of this mineral but for now we have given it the nickname “tugtulite” for a combination of sodalite and tugtupite.



**Solid Sodalite** – Some of the nicest solid pieces of sodalite have been found in the Tunulliarfik areas. These pieces are simply glowing embers under UV light. They are often quite tenebrescent, and can overwhelm almost any piece placed next to it in a display cabinet. Natural colors range from a pale white to a deep green and most are quite translucent.



**Pea-Green Sodalite** – An exceptionally bright variety of sodalite comes from a single area within the Tunulliarfik Fjord. This variety is colored a bright “pea-green” under natural light. It is somewhat coarse grained with aegirine distributed throughout. Under longwave the pieces glow as if they were on fire. Interestingly they are not tenebrescent.

## Kangerluarsuk

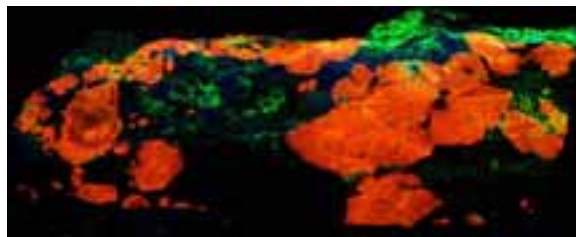
The Kangerluarsuk Fjord forms the southeast boundary of the Ilimaussaq Complex. Like Tunulliarfik, the fjord cuts right through the complex. Steep cliffs rise from each side of the fjord. A large, relatively flat, rock-strewn area is located at the end of the fjord and is one of the three most productive areas in the complex. Significant exploration in the '60s revealed large deposits of beryllium, finds of tugtupite and other rare minerals. It was in this area that a find of deeply tenebrescent green sodalite was made in 2000. A large boulder, the outward appearance unremarkable, was split with a hammer. The sodalite inside was colored a deep and bright purple. After a few minutes the purple faded to a bright green. Once examined under shortwave UV the brightness of the sodalite was amazing, and to add to that, the color change returned! The pieces once again darkened to a deep purple. This find is responsible for the continued exploration of the complex for fluorescent minerals.



## Kangerluarsuk Minerals

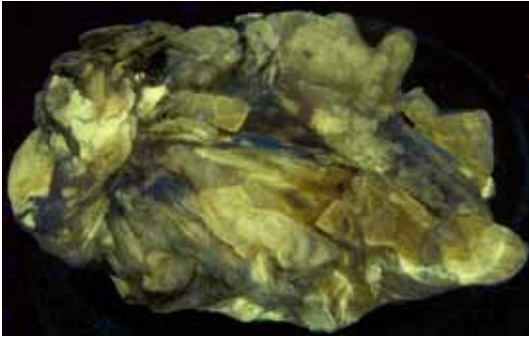


**Tenebrescent Green Sodalite** – Under natural light a greenish colored sodalite interspersed in a lujavrite matrix. Both SW and LW UV cause a brilliant orange fluorescence, and once removed from the SW source the green areas have turned a dark grape purple. After a few minutes exposure to light the purple will fade back to green and the process can be repeated. Most of these pieces also have a bright green “coating” of some uranyl activated (most likely) mineral. Another commonly found mineral in these

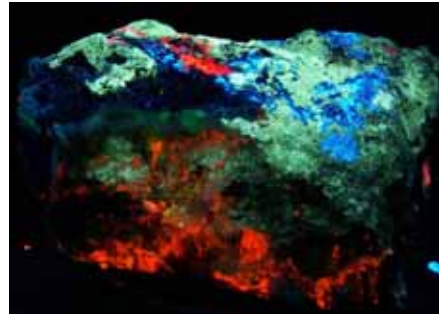




specimens is Steenstrupine; in those pieces a slight amount of radioactivity may be detected.



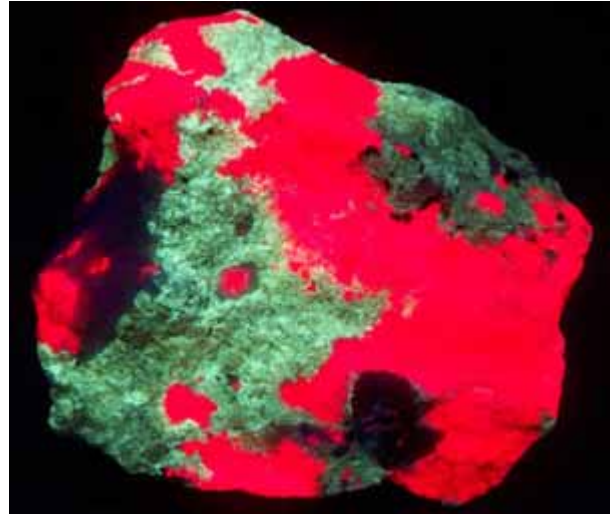
**Polyolithionite** - Ilimaussaq is the type locale for this beautifully fluorescent mineral. It is a lithium mica found almost everywhere in the pegmatite dikes and the syenites. Tablets up to two feet have been found sparkling with faint green plates of polyolithionite. Under SW they glow a brilliant yellow/white. Polyolithionite specimens from Kangerluarsuk are exceptionally well formed, large and bright. Polyolithionite grows as veins within other minerals (most often ussingite and tugtupite) and in mica's typical habit as plates atop the lujavrites and other rocks in the complex.



### **Combination Sodalite, Tugtupite and Polyolithionite**

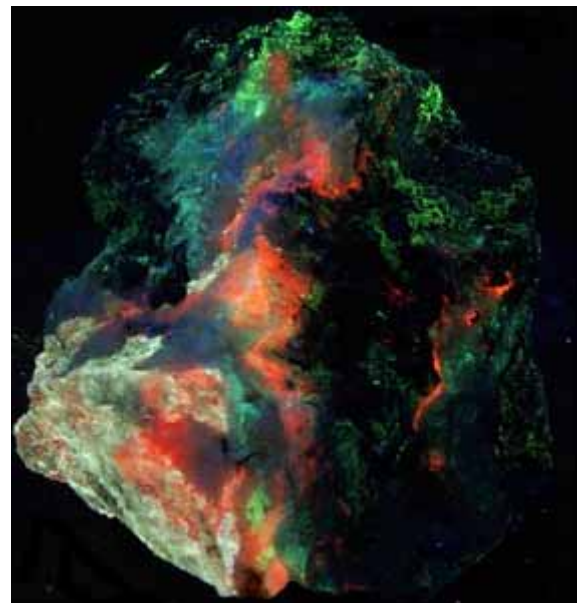
There are reports from material written in the 60's of a trail of large white boulders running from the base of the cliffs to the water's edge; the result of a vein of albite/tugtupite from which the surrounding syenites had eroded away. These boulders have since disappeared, but each winter the water and ice seem to "dig up" additional specimens of white material in frost heaves which, when put under UV, rate among the prettiest minerals of the complex.

The sodalite is nicely tenebrescent, and glows a bright orange, while the tugtupite glows a bright cherry red. Fine-grained polyolithionite glows a brilliant yellow/white. The blue FL in this picture "escaped" (some lucky Ebay buyer) before it could be identified, and no more specimens like this one have been found.



### **Tugtupite and Polyolithionite**

Kangerlussaq yields dramatic specimens of a white variety of tugtupite (appears to be albite under natural light). When associated with small crystals of polyolithionite the brightness and depth of the red tugtupite is amazing.



### **Tugtupite, Sodalite, Polyolithionite, and numerous unknowns**

Complex and striking mixed specimens are found in frost heaves where an ancient albite vein has broken up over the millennia. These pieces usually consist of an albite and aegirine matrix and seem to have every mineral found in the complex associated with them.

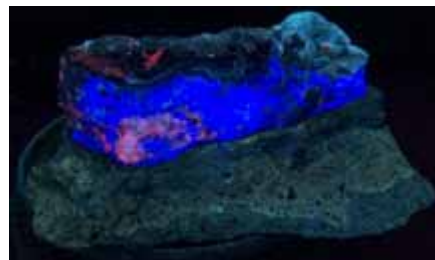
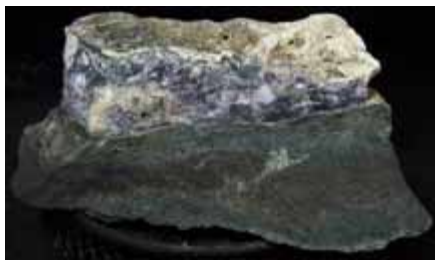


### Checkers Sodalite

Some varieties of sodalite are a pure white under natural light. In the Kangerlussaq area one type was found that at first seemed innocuous – when a white rock was split it did not appear to be anything special. But after a few minutes of exposure to the sunlight it quickly turned purple! Further investigation showed that this material almost turned black under shortwave UV. This variety of sodalite is extremely tenebrescent – reacting to sunlight, longwave, and shortwave. It is also quite rare as only a couple of kilos were found.

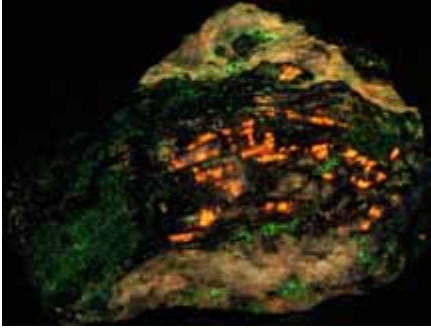
### Mysteries

Fluorescent minerals from the Ilimaussaq Complex are slowly being identified as they are found. This process is time consuming and difficult; many specimens contain unknown minerals, with wonderful fluorescence. The purist would first identify these minerals before presenting them to the collecting public – but that takes half the fun out of the hobby. Listed below are pictures, some best guesses, and general observations on some of the (current) mystery finds.



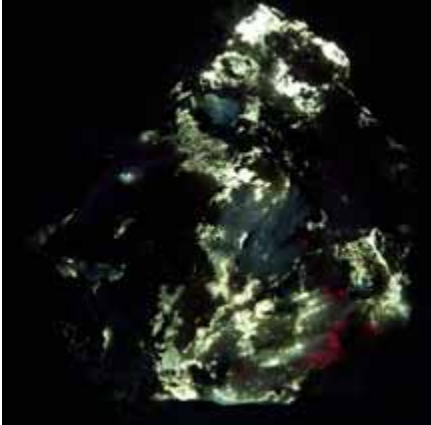
### Fluorite and Sodalite (Locale uncertain)

A very rare combination these pieces were believed to be from the Taseq Slopes but the original cache was lost and has not been rediscovered. The fluorite vein runs atop a matrix of gray lujavrite and the sodalite is interspersed throughout. Also a lilac FL mineral is present which has not yet been identified.



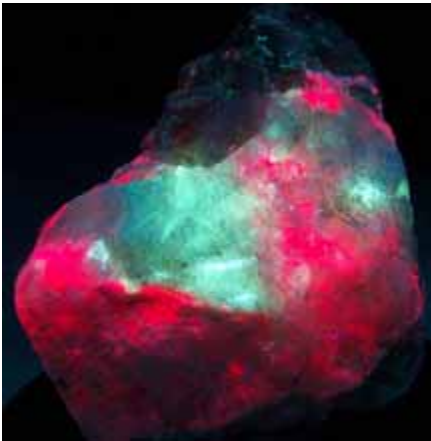
### **Sodalite with ?**

Found on the Taseq Slopes this mineral has two veins of a yellowish green FL mineral enclosing coarse grains of sodalite. It is medium bright, white under natural lighting.



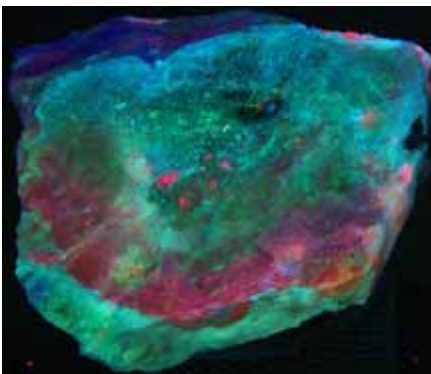
### **Sorensenite and ?**

Sorensenite is found throughout the complex but is most notable in the Kvanefjeld area. This specimen was found on the Taseq Slopes and consists of a well-defined crystal in the center – dull yellow/white FL. The mystery is the bright yellow FL from an unknown mineral, perhaps sorensenite in another form?



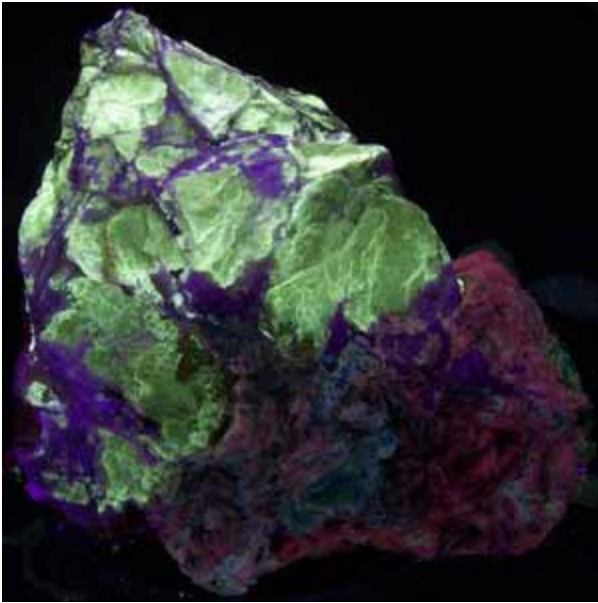
### **Tugtupite and ?**

This specimen was found in the Kangerlussaq area. It appears to simply be albite under natural lighting, but SW UV reveals the deep cherry red of tugtupite and a brilliant white FL from an unknown mineral. The white FL areas are deeply phosphorescent.



### **Tunulliarfik Unknown**

A large boulder of sodalite was recovered with this lime green, deeply phosphorescent mineral associated with it. Areas of cherry red tugtupite are sprinkled throughout, and a vein of dimly fluorescent sodalite is enclosed in the lime green FL mineral. Natural color is white.



### **Polyolithionite with Purple Fluorescing Mineral**

Some nicely formed polyolithionite formations from the Kangerlussaq area have a white mineral associated with them which glows a medium bright purple under SW. The feldspar matrix on these pieces also glows the typical dark crimson found with many feldspars.

### **Summary**

The fluorescent minerals of Greenland bring a new and exciting challenge to the hobby. Dozens of new very collectable varieties are being found. As can be seen from this text, many are combinations of just a few rare and exotic minerals – mixed together to create simply awesome specimens. In many cases it has proven extremely difficult to identify some finds. And only the surface has been touched – literally! Collecting in Greenland to date has been focused on surface rocks. Over the coming years veins will be explored and fresh material brought to light that has never seen sunlight. Knowledgeable collectors are making trips to the complex and making new discoveries every year. Who knows what is waiting to be discovered?

## Minerals found in the Ilimaussaq Complex

Aegirine	Djurleite	Lomonosovite	Rutile
<b>Aenigmatite</b>	Dyscrasite	Lomonosovite-β	Sauconite
Albite *	Elpidite	Lorenzenite	Seinaejokite
Allanite-(Ce)	<b>Emeleusite</b>	Lovdarite	<b>Semenovite</b> -(Ce)
Allargentum	Ephesite	Lovozerite	Senarmontite
Analcime *	Epididymite	Lueshite	Sepiolite
Ancylite-(La)	Epidote	Magnetite	Serandite
Antigorite	<b>Epistolite</b>	Malachite	Siderite
Antimony	<b>Eudialyte</b>	Marcasite	Silver
<b>Arfvedsonite</b> *	Eudidymite	Microcline *	<b>Skinnerite</b>
Argentite	Evenkite	Molybdenite	Skutterudite
Astrophyllite	Famatinite	Monazite-(Ce)	<b>Sodalite</b> *
Augite	Fayalite	Montmorillonite	Soda-microcline *
Avicennite	Fersmite	Mosandrite	Soda-orthoclase *
Azurite	Fluorapatite	Murmanite	<b>Sorensenite</b> *
Barylite	Fluorapophyllite	Muscovite	Sphalerite *
Bastnaesite-(Ce)	Fluorite *	<b>Nabesite</b>	Stannite
Bertrandite	Galena	<b>Nacareniobsite</b> -(Ce)	<b>Steenstrupine</b> -(Ce)
Beryllite *	Garnet-group	Nahcolite	Stilbite
Beudantite	Genthelvite	Narsarsukite	Stillwellite
Biotite	Gerasimovskite	Natrolite	Synchysite-(Ce)
Bornite	Gibbsite	<b>Naujakasite</b>	Tetrahedrite
Breithauptite	Gmelinite	Nenadkevichite	Tetranatrolite
<b>Britholite</b> -(Ce)	Goethite	Nepheline	Thalcusite
Brochantite	Graphite	Neptunite	Thermonatrite
Calcite *	Gudmundite	Nickeline	Thorianite
Cancrinite	Halloysite	Niobophyllite	Thorite
Carbonate-hydroxylapatite	Hastingsite	Nontronite	Tin
Catapleiite *	Hedenbergite	<b>Odintsovite</b>	Titanite
Cerussite	Helvite	<b>Orthojoaquinite</b> -(La)	Todorokite
Chabazite	Hemimorphite	Orthoclase	Troilite
Chalcedony	Herschelite	Palygorskite	Trona
Chalcocite	Hiortdahlite	Pearceite	<b>Tugtupite</b> *
Chalcopyrite	Hisingerite	Pectolite	Tundrite-(Ce)
Chalcostibite	Hydrocerussite	Plagioclase	<b>Tundrite</b> -(Nd)
<b>Chalcothallite</b>	<b>Ilimaussite</b>	Plattnerite	<b>Tuperssuatsiaite</b>
Chkalovite *	Ilmenite	Polybasite	Turkestanite
Chlorite-group	Ilvaite	<b>Polyolithionite</b> *	<b>Ussingite</b> *
Chrysocolla	Joaquinite	Prehnite	Valentinite
Connellite	Katophorite	Pyrite	Vesuvianite
Cookeite	Komarovite (var. Sodium-K.)	Pyrochlore	Villiaumite *
Copper	<b>Kvanefjeldite</b>	Pyrolusite	Vinogradovite
Covellite	Lead	Pyrophanite	<b>Vitusite</b> -(Ce)
<b>Cuprostibite</b>	Lepidolite	Pyrrhotite	Vrbaite
Diaspore	Leucophanite	Quartz *	Vuonnemite
Digenite	Leucosphenite	Rhabdophane-(Ce)	Westerveldite
Diopside	Linarite	Riebeckite	Whewellite
Djerfisherite	Litharge	<b>Rinkite</b>	Willemite
	Loellingite	<b>Rohaite</b>	Zircon *
		Rosenbuschite	

**Bold** – Type Locale

\* - Observed to be Fluorescent (by MinerShop)