

# Meddelelser om Grønland,

udgivne af

Commissionen for Ledelsen af de geologiske og geographiske  
Undersøgelser i Grønland.

---

**Fire og tyvende Hefte.**

---

Med 20 Tavler,  
et særskilt heftet, farvetrykt Bilag

og en

•  
**Résumé des Communications sur le Grønland.**

---

Kjøbenhavn.

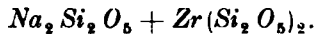
I Commission hos C. A. Reitzel.

Bianco Lunos Bogtrykkeri.

1901.

only the light yellowish columns that prove to be in a tolerably unaltered condition. But that sort of material has evidently not been at Lindström's disposal. He states his material to have been of a faint silky lustre; now this is characteristic of the common asbestos-like form, which always is more or less altered. The nature of this alteration is not, of course, known with certainty. That it is combined with hydration, is, however very probable. The amount of water found, except  $\frac{1}{2}$  per cent, goes off before ignition, and 5,89 % is lost at a temperature between  $15^{\circ}$  and  $100^{\circ}$  C.

It can, therefore, hardly be doubted that at least part of the water percentage is secondary. If the whole of the water is considered as secondary, the original mineral should have the following composition:



This composition would be quite analogous to that of the minerals narsarsukite and leucosphenite, which are however known only in the fresh state.

### 30. Narsarsukite.

The new mineral which is to be described in the following lines was the first that attracted my attention on Narsarsuk. None of the other new minerals has been found at so many different localities on the plateau or is so largely distributed there. It may therefore, more than any other mineral, be said to be characteristic of the place. On this ground I propose for it the name narsarsukite<sup>1)</sup>.

---

<sup>1)</sup> Persons familiar with the Greenlandian or Esquimaux language have told me that the name of the plateau, which name is said to signify "the great plain", should be written Narsarsuk. Of this I was not, however, informed, until the plates belonging to the present article, had been printed. Therefore the name of the mineral is given in Plate VIII in the form narsasukite in accordance with the pronunciation of the

The mineral occurs only as crystals; on account of its eminent cleavage, however, the crystals are highly subject to being broken or split. One, therefore, seldom meets with whole crystals, but mostly only fragments. These fragments, however, present, on the whole, the same forms as the unbroken crystals and are bounded by the same faces.

The crystals belong to the tetragonal system and, probably, to the bipyramidal class of this system. From the angle

$$(111) : (110) = 53^{\circ} 29'$$

is calculated the axial ratio

$$a : c = 1 : 0,52852.$$

The crystals are bounded by the following forms:

$$c = \{001\}, \quad a = \{100\}, \quad m = \{110\}, \quad n = \{210\}, \quad p = \{111\}.$$

The base is generally the predominant form. Therefore the crystals are almost always tabular parallel to this form. Only on very small crystals do the prismatic faces sometimes attain the same size as the basal faces. The crystals are then of a cubic form; occasionally they may even be of short prismatic habit parallel to the  $c$ -axis. Among the faces in the vertical zone the prism of the first order  $m$  is in the majority of cases the predominant form. The prism of the second order  $a$  then appears as a truncation of the vertical edges. The tetragonal prism of the third order  $n$  is rather rare, it is always represented by narrow planes, sometimes it occurs only as a striation in combination with the other vertical faces (Fig. 5, Plate VIII). This tetragonal prism has never been observed represented by the full number of faces, but always, even when several of its faces occur on the same crystal, only on one

---

Greenlanders who accompanied me during my excursion in 1897, the only pronunciation that I ever heard. This is also the reason why the form Narsasuk is used in the account of my journey in this Journal, Vol. 14 p. 251.

side. This indicates pyramidal hemihedrism. I have tried to produce etching figures in order to establish this fact. But my attempts have been unsuccessful. The only acid that acts upon the mineral is hydrofluoric acid. But it only makes the faces dull. Neither macroscopically nor under the microscope have I been able to observe any distinct etching figures.

On a few crystals from one locality the prism of the second order  $a$  is alone present in the vertical zone (Fig. 6, Plate VIII). The only pyramidal form that has been observed on these crystals is the fundamental pyramid  $p$ . It does not occur on many crystals, and its faces are always very narrow (Fig. 7, Plate VIII). On the crystals which have only the prism of the second order in the vertical zone the fundamental pyramid is present as small triangular truncations of the corners (Fig. 6, Plate VIII).

As regards the physical properties of the faces the following facts may be stated. The basal planes are always somewhat uneven and seldom bright. The unevenness is due to small rounded elevations, which mostly seem to be irregular, but occasionally, especially on small cube shaped crystals, assume the form of very obtuse pyramids, which seem to be arranged parallel to the main pyramid. All the vertical faces are highly brilliant, but generally also strongly striated in vertical direction. The faces of the fundamental pyramid are smooth and brilliant. From the above it will be understood that the crystals are not suited for accurate reflection measurements. The base rarely gives good or fair reflections. The vertical faces give, owing to the striation, only approximate angular values with one another. On the other hand the angle between the pyramidal and prismatic faces can be determined with desirable accuracy, and the axial ratio calculated from it may therefore, be regarded as quite exact.

A few other values of angles are, however, also given here.

	Measured	Calculated
$m : m' = (110) : (\bar{1}\bar{1}0) = 90^\circ 4'$	$90^\circ 4'$	$90^\circ$
$m : a = (110) : (100) = 44^\circ 53'$	$44^\circ 53'$	$45^\circ$
$a : a' = (100) : (100) = 89^\circ 52'$	$89^\circ 52'$	$90^\circ$
$n : a = (210) : (100) = 17^\circ 58'$	$17^\circ 58'$	$18^\circ 17'$
$c : a = (001) : (100) = 90^\circ 3'$	$90^\circ 3'$	$90^\circ$
$p : c = (111) : (001) = 36^\circ 24'$	$36^\circ 24'$	$36^\circ 51'$
$p : a = (111) : (100) = 65^\circ 2'$	$65^\circ 2'$	$65^\circ 7'$

Twin crystals do not seem to occur.

The specific gravity of narsarsukite was determined by the direct weighing of a pure crystal hanging by a hair first in air, then in distilled water. It was found to be 2,761 at a temperature of 20° C. The hardness of the mineral is a little above 7. One can produce faint scratches on quartz with the mineral; on the other hand it is more easily scratched by topaz. The mineral has a most eminent cleavage parallel to the fundamental prism *m*. In the direction of this cleavage the crystal tables very readily cleave into cube shaped fragments. Owing to this cleavage it is impossible to produce coherent thin sections perpendicular to the principal axis. Even in sections parallel to the same axis the cleavages are easily observable. Fracture, which, unless special measures are taken, is always obtained in a direction parallel to the *c*-axis, is columnar with vitreous lustre. The prismatic faces often have a pearly lustre.

In colour narsarsukite is honey-yellow with a tinge of reddish brown in the clearest portions. On incipient weathering the colour passes into ochre-yellow. Other crystals, which are in part altered, are brownish grey. In sections parallel to the principal axis the mineral is colourless. In an ordinary thin section no pleochroism is observable. In thicker sections, on the other hand, it is fairly distinct. The absorption is greatest parallel to the *c*-axis, and the axial colour is reddish yellow.

This colour is not, however, evenly distributed, but appears in spots, between which there are uncoloured portions. When light vibrates perpendicularly to the *c*-axis, the sections are colourless. Sections parallel to the base show a regular, axial interference figure. The double refraction is positive. The indices of refraction were determined by means of a calc spar prism with a refracting edge (parallel to the *c*-axis) cut at  $44^{\circ} 7'$  and were found as follows:

	<i>Li</i>	<i>Na</i>	<i>Tl</i>
$\omega =$	1,5492	1,5532	1,5576
$\epsilon =$	1,5801	1,5842	1,5861

Narsarsukite has been analyzed by Mr. Chr. Christensen in Copenhagen. As there was a rich supply of pure fresh material for the analysis, the correctness of the determinations could be established by repeated trials. The result of the analysis is as follows:

		Molecular ratios	
<i>SiO</i> <sub>2</sub>	61,63	1,0271	24
<i>TiO</i> <sub>2</sub>	14,00	0,1707	4
<i>Fe</i> <sub>2</sub> <i>O</i> <sub>3</sub>	6,30	0,0394	} 1
<i>Al</i> <sub>2</sub> <i>O</i> <sub>3</sub>	0,28	0,0027	
<i>MnO</i>	0,47	0,0067	} 6
<i>MgO</i>	0,24	0,0060	
<i>Na</i> <sub>2</sub> <i>O</i>	16,12	0,2600	
<i>F</i> <sub>2</sub>	0,71	0,0187	} 1
<i>H</i> <sub>2</sub> <i>O</i>	0,29	0,0161	
	100,04		
— <i>O</i> = <i>F</i> <sub>2</sub>	0,30		
	99,74		

If the sesquioxides are taken together with the fluorine and *H*<sub>2</sub>*O* as a bivalent group *FeF*, and if this group is



which has the same yellow colour as the unfused mineral. With salt of phosphorus a skeleton of silica is obtained, and the bead is coloured by titanium. The mineral is not acted upon by other acids than hydrofluoric acid.

Narsarsukite has been found at the localities Nos. 1, 6, 7, and 13 on Narsarsuk, consequently only in the southern part of the mineral-bearing area. The largest quantity was collected at the locality No. 1. It occurred here together with quartz, microcline, albite, aegirine, graphite, elpidite, epididymite, and the new mineral tainiolite. Narsarsukite is one of the earliest-formed minerals at the place. Only aegirine seems to be older, since needles of this mineral sometimes are found traversing the narsarsukite tables. On the other hand, fully developed narsarsukite crystals intrude into the individuals of feldspar as well as into those of quartz. The other accompanying minerals are still later formations than the last-mentioned. However, the small cube shaped narsarsukite crystals are probably of later formation, since they occur loosely implanted in open spaces between the other minerals. The locality No. 6 did not differ in any respect from No. 1 excepting that the mineral was met with here in a far smaller quantity. At the locality No. 13 narsarsukite occurred as large, well-developed crystalline tables firmly implanted in feldspar and quartz. They were not, however, quite fresh, but earthy on the surfaces and brown in colour. At the locality No. 7 only a few loose specimens were found, on which narsarsukite occurred associated with neptunite of type III; it is, of course, older than that mineral.

### 31. Chalcolamprite.

As far as hitherto known, pyrochlore is a mineral which occurs exclusively in syenite rocks. Thus the mineral was first discovered in the syenite of southwestern Norway, where it is met with in several places. In the Ilmen mountains near Miass