

Min. Mitt., **31**, 525 (1912), on Pikes Peak crystals, unit of the structure cell of Oftedal (1931). Transformation: Koechlin to Oftedal, 1000/0100/0010/0002; Lacroix, *Bull. soc. min.*, **35**, 108 (1912), to Oftedal, 1000/0100/0010/0002.

2. Koechlin (1912), Lacroix (1912; **1**, 297, 1922).
3. Oftedal (1931) on crystals from West Cheyenne Canyon, Colorado.
4. See Koechlin (1912); Oftedal, *Norsk Geol. Tidsskr.*, **12**, 459 (1931); Lacroix (1912).
5. Value obtained by Fleischer in Glass and Smalley, *Am. Min.*, **30**, 601 (1945), on Gallinas material and by Wolfe, priv. comm. (1946), on Colorado material and probably best representative of the mineral. The wide reported range probably includes altered material.
6. See summary by Glass and Smalley (1945).
7. Older analyses are summarized by Hintze (**1** [3A], 3418, 1929) and Glass and Smalley (1945).
8. Hillebrand, *Am. J. Sc.*, **7**, 51 (1899).
9. Pisani analysis in Lacroix (1912).
10. Silberminz, *C. r. ac. sc. U.R.S.S.*, ser. A, 55 (1929). The earlier analysis of kischtimite by Karavayev (1861) shows F 6.35 per cent [see Flink in Doelter (**1**, 536, 1912)].
11. Glass and Smalley (1945).
12. Geijer, *Sver. Geol. Undersök.*, *Årsbok*, **14**, no. 6 (1920).

BEIYINITE. *Ho* (*Bull. Geol. Soc. China*, **14**, 279, 1935).

A name provisionally given to a greenish yellow mineral found as minute grains with a perfect basal cleavage. Presumed to be a carbonate of the rare earths from spectrographic analysis of the enclosing rock. H. $\sim 4\frac{1}{2}$. G. 4.83. Uniaxial negative (—), with $nO = 1.717$, $nE = 1.791$ (for Na). Feebly pleochroic. Insoluble in HCl, but soluble with difficulty in hot concentrated H_2SO_4 with effervescence. Infusible. Found associated with grains of magnetite, pyrite, barite, and oboite in fluorite veins in an iron ore deposit at Beiyin-Obo, north of Paoto, Suiyuan, Inner Mongolia. The mineral resembles bastnaesite.

OBORITE. *Ho* (*Bull. Geol. Soc. China*, **14**, 279, 1935).

Found with beiyinite (which see) as minute, greenish yellow grains with a rhombohedral (?) cleavage. Perhaps hexagonal, with $a:c = 1:1.07$, from the angle $51^\circ 12'$ measured optically from c to the $\{10\bar{1}1\}$ cleavage. H. $\sim 4\frac{1}{2}$. G. ~ 4.83 . Tests as for beiyinite, but less soluble in H_2SO_4 . Presumed to be a carbonate of the rare earths.

16.2.10 **ANCYLITE** [(Ce,La) $_4$ (Sr,Ca) $_3$ (CO $_3$) $_7$ (OH) $_4$ ·3H $_2$ O]. Ankylit *Flink* (*Medd. Grønland*, **14**, 235, 1899; **24**, 49, 1901). Ansilite. Calcio-ancylite *Tschernik* (*Bull. ac. sc. Russie*, [6], 17, 81, 1923).

CALCIO-ANCYLITE [(Ce,La) $_4$ (Ca,Sr) $_3$ (CO $_3$) $_7$ (OH) $_4$ ·3H $_2$ O]. Eisenkalkankylit, Mangankalkankylit *Tschernik* (*Verh. min. Ges. St. Petersburg*, **41**, 43, 1904).

C r y s t.¹ Orthorhombic; dipyramidal— $2/m\ 2/m\ 2/m$.

$$a:b:c = 0.571:1:0.534; \quad p_0:q_0:r_0 = 0.935:0.534:1$$

$$q_1:r_1:p_1 = 0.571:1.069:1; \quad r_2:p_2:q_2 = 1.873:1.751:1$$

Forms:²

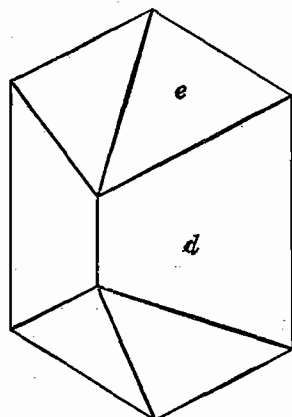
	ϕ	$\rho = C$	ϕ_1	$\rho_1 = A$	ϕ_2	$\rho_2 = B$
$d\ 120$	$41^\circ 12'$	$90^\circ 00'$	$90^\circ 00'$	$48^\circ 48'$	$0^\circ 00'$	$41^\circ 12'$
$e\ 111$	$60\ 16$	$47\ 07$	$28\ 07$	$50\ 29$	$46\ 55\frac{1}{2}$	$68\ 41\frac{1}{2}$

Habit. Pseudo-octahedral, the faces curved and often dull; short prismatic [001]. As groups and crusts of small rounded crystals.

Phy s. No cleavage. Fracture splintery, rather tough. Somewhat brittle. H. 4–4 $\frac{1}{2}$. G. 3.95 (*ancylite*). Luster vitreous on faces, greasy on

fracture surfaces. Color pale yellow with tinge of orange; also yellowish brown to brown, gray. Streak white. Translucent to subtranslucent.

Opt.³ In transmitted light colorless, but sometimes clouded by inclusions (Narsarsuk).



Narsarsuk.

ORIENTATION		$n_{\text{Hg yellow}}$ (ancylite, Narsarsuk)	
X	a	1.625	Biaxial negative (-). 2V medium large.
Y	b	1.700	
Z	c	1.735	

Chem. A hydrated basic carbonate of strontium, calcium, and the cerium group of rare earths. Analysis 2 is close to the formula $(\text{Ce}, \text{La})_4(\text{Sr}, \text{Ca})_3(\text{CO}_3)_7(\text{OH})_4 \cdot 3\text{H}_2\text{O}$, but the materials of analyses 3, 4, and 5 afford somewhat different ratios. Sr, Ca, Fe'', and Mn'' substitute mutually. The species names ancylite and calcio-ancylite are applied to the halves of the series with $\text{Sr} > \text{Ca}$ and $\text{Ca} > \text{Sr}$, respectively.

Anal.

	1	2	3	4	5	6
CaO		1.52	4.36	13.01	12.83	13.78
SrO	22.81	21.03	12.11			
BaO			1.59	tr.	tr.	
FeO		0.35		5.36		
MnO		tr.			5.55	
Y ₂ O ₃		tr.	0.74	tr.	tr.	
Ce ₂ O ₃	24.08	22.22	47.27	44.58	35.61	26.90
(La, Di) ₂ O ₃	23.90	24.04		5.42	14.21	26.70
CO ₂	22.60	23.28	28.38	23.78	23.70	25.24
H ₂ O	6.61	6.52	5.55	6.97	6.94	7.38
Insol.		0.80			0.22	
Total	100.00	99.76	100.00	99.12	99.06	100.00
G.		3.95	3.82	4.298	3.962	

1. $(\text{Ce}, \text{La})_4\text{Sr}_3(\text{CO}_3)_7(\text{OH})_4 \cdot 3\text{H}_2\text{O}$, with $\text{Ce}:\text{La} = 1:1$. 2. Ancylite. Narsarsuk.⁴ Rem. is ThO_2 0.20, F tr., insol. 0.60. 3. Calcian ancylite. Khibina tundra, U.S.S.R.⁶ Recalculated to 100 after deducting natrolite. 4. Ferroan calcio-ancylite. Russia (*eisenkalkankylit*).⁶ 5. Manganian calcio-ancylite. Russia (*mangankalkankylit*).⁶ 6. $(\text{Ce}, \text{La})_4\text{Ca}_3(\text{CO}_3)_7(\text{OH})_4 \cdot 3\text{H}_2\text{O}$, with $\text{Ce}:\text{La} = 1:1$.

Tests. B.B. infusible. Easily soluble in acids. In C.T. loses water freely

Occur. Ancylite occurs in druses in pegmatitic veinlets in nepheline-syenite at Narsarsuk in the Julianehaab district, Greenland, associated with aegirite, albite, microcline, zircon, synchisite, cordylite, eudidymite. A calcian ancylite occurs similarly in nepheline-syenite pegmatite in the Khibina tundra, Kola peninsula, U.S.S.R., associated with natrolite and yttrocerite. Calcio-ancylite is known only from an unstated locality in western Russia, where it was found in a granitic boulder.

Name. From *ανκυλος*, *curved*, in allusion to the rounded and distorted character of the crystals. The name calcio-ancylite has been used by some

authors as a name for calcian varieties of ancylite but is here applied as a species designation for material with $\text{Ca} > \text{Sr}$.

Ref.

1. Gordon, *Proc. Ac. Sc. Philadelphia*, 77, 1 (1925) from approximate measurements on rounded ancylite crystals from Narsarsuk.
2. Gordon (1925); Flink (1899) on ancylite.
3. Gordon (1925). Larsen (39, 1921) gives $n_X = 1.865$ (variable), $2V \sim 0^\circ$, and optically positive for a mineral labeled ancylite but probably not that species. Flink (1899) also states the mineral to be positive. The optical orientation is doubtful.
4. Mauzelius analysis in Flink (1901).
5. Tschernik (1923).
6. Tschernik (1904).

AMBATOARINITE. *Lacroix (Bull. soc. min., 38, 265, 1915).*

Probably orthorhombic. In microscopic crystals, often with parallel axes in skeletal groups. Color pink to reddish or black (due to ferruginous impurities). Optically negative (-), with $n_X > 1.658$ and a birefringence of about 0.08. Axial plane {010}, with $X = c$. In thin section the crystals show a prism angle near 95° . Material separated from celestite by solution in cold dilute HCl gave on analysis: Ce_2O_3 34.1, $(\text{La}, \text{Di})_2\text{O}_3$ 22.7, SrO 17.8, CO_2 25.4, total 100.0 (recalculated to 100 from original total of 18.96). This is close to the formula $\text{Sr}_5(\text{Ce}, \text{La}, \text{Di})_{10}(\text{CO}_3)_{17}\text{O}_3$.

Found at Ambatoarina, near Ambositra, Madagascar, enclosed in plates of celestite in veins of manganoan calcite and quartz in metamorphosed limestone. Associated minerals are aegirite, biotite, microcline, galena, and abundant monazite.

Needs investigation, particularly in relation to ancylite.

WEIBYTE. *Brögger (Zs. Kr., 16, 650, 1890).*

An incompletely described mineral that may be related to or identical with ancylite. In minute orthorhombic crystals with a habit and angles near those of zircon. Observed forms: {111}, {110}, {540}?, {201} or {021}, with $a:b:c = 1.00:1:0.64$. Colorless internally but covered with a thin yellow ocher-like crust that penetrates inward to some extent. Biaxial negative (-) with $Z = c$ and $2E \sim 110^\circ$. A partial analysis made on impure material indicates that the substance is a fluo-carbonate of Ce and La with minor Ca and Sr. Found with eudidymite, natrolite, and analcite in pegmatitic veins in nepheline-syenite on the island Övre-Arö in the Langesund fiord, Norway. A similar mineral has been reported¹ as occurring very sparingly as yellowish to brownish red bipyramidal crystals, with G. 3.19, in cavities in granite at Baveno, Italy. Named after the Norwegian mineralogist P. C. Weibye.

Ref.

1. Artini, *Acc. Linc., Rend.*, ser. 5, 24, 313 (1915).