Calcioancylite-(Ce) $(Ca,Sr)(Ce,La)_3(CO_3)_4(OH)_3 \cdot H_2O$

Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* [*m*.] As pseudo-octahedral dipyramidal to prismatic crystals with curved faces, to 2 mm; in subparallel aggregates; may occur as zoned intergrowns with ancylite-(Ce).

Physical Properties: *Fracture:* Splintery. *Tenacity:* Somewhat brittle. Hardness = 4–4.5 D(meas.) = 3.95 D(calc.) = n.d. May be pale pink in daylight, fluorescing pale bluish gray under indoor fluorescent light.

Optical Properties: Transparent to translucent. *Color:* Pink, white, gray; colorless in transmitted light. *Streak:* White. *Luster:* Vitreous, greasy on fractures.
Optical Class: Biaxial (–). *Dispersion:* $r < v$, barely perceptible. $\alpha = 1.654(3)$ $\beta = 1.733(3)$ $\gamma = 1.772(3)$ 2V(meas.) = 60°–70°

Cell Data: *Space Group:* [*Pm*] [by analogy to calcioancylite-(Nd)]. a = n.d. b = n.d. c = n.d. β = n.d. Z = n.d.

X-ray Powder Pattern: Ilímaussaq intrusion, Greenland.
2.94 (100), 4.32 (75), 2.33 (45), 3.66 (40), 2.07 (35), 5.54 (30), 2.00 (30)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
CO_2	n.d.	n.d.	22.88	Sm_2O_3	0.21	0.65	
La_2O_3	21.85	11.44		CaO	7.55	6.59	7.29
Ce_2O_3	31.07	30.97	63.98	SrO	0.25	6.68	
Pr_2O_3	2.67	2.62		F	0.72		
Nd_2O_3	7.64	9.31		H_2O	n.d.	n.d.	5.85
				Total			100.00

(1) Ilímaussaq intrusion, Greenland; partial analysis, corresponding to $(Ca_{1.04}Sr_{0.02})_{\Sigma=1.06}(Ce_{1.44}La_{1.02}Nd_{0.34}Pr_{0.12})_{\Sigma=2.92}(CO_3)_4(OH)_3 \cdot H_2O$. (2) Afrikanda massif, Russia; partial analysis, corresponding to $(Ca_{0.92}Sr_{0.50})_{\Sigma=1.42}(Ce_{1.46}La_{0.54}Nd_{0.44}Pr_{0.12}Sm_{0.02})_{\Sigma=2.58}(CO_3)_4(OH)_3 \cdot H_2O$. (3) $CaCe_3(CO_3)_4(OH)_3 \cdot H_2O$

Occurrence: A rare mineral, found in late-stage miaroles in granite (Baveno, Italy); in Alpine-cleft type fissures (Cornog, Pennsylvania, USA; Polar Ural Mountains, Russia); in alkaline igneous rocks (Mont Saint-Hilaire, Canada; Ilímaussaq intrusion, Greenland; Kola Peninsula, Russia); and in leucite-bearing lamproite dikes (Baffin Island, Canada).

Association: Potassic feldspar, natrolite, aegirine, catapleiite, perovskite, astrophyllite, titanite, apatite, anatase, synchysite, quartz, calcite, actinolite, pyrite (Cornog, Pennsylvania, USA).

Distribution: From Russia, originally found in a glacial erratic boulder; from the Afrikanda pyroxenite massif, Kola Peninsula, and at Dodo and Puiva, Polar Ural Mountains. From Baveno, Italy. In the Kalcherkogel tunnel, Styria, Austria. Found near Mendig, Eifel, Germany. From Cezlak, west-northwest of Slovenska Bistrica, Slovenia. At Tvedalen, near Larvik, Norway. In Greenland, at Narssârssuk, and near the head of the Lilleelv River, Ilímaussaq intrusion. In the USA, from the Keystone quarry, near Cornog, Chester Co., Pennsylvania, and at the Foote mine, Cleveland Co., North Carolina. From Mont Saint-Hilaire, Quebec, and at Napoleon Bay, Baffin Island, Canada.

Name: For its *calcium* content and from the Greek for *curved* in allusion to the typical rounded and distorted crystal habit; and for the dominant rare earth element, *cerium*.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 291–293. (2) Pekov, I.V., O.V. Petersen, and A.V. Voloshin (1997) Calcio-ancylite-(Ce) from Ilímaussaq and Narssârssuk, Greenland, Kola Peninsula and Polar Urals, Russia; ancylite-(Ce) – calcio-ancylite-(Ce) an isomorphous series. Neues Jahrb. Mineral., Abh., 171, 309–322.