

Lukechangite-(Ce)**Na₃Ce₂(CO₃)₄F**

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Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Tabular to short prismatic, barrellike crystals, to 1 mm, showing {0001}, {11 $\bar{2}$ 0}, {11 $\bar{2}$ 1}, striated parallel {0001}.

Physical Properties: *Cleavage:* Perfect on {0001}. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. Hardness = ~ 4.5 D(meas.) = > 3.3 D(calc.) = 4.02

Optical Properties: Semitransparent. *Color:* Colorless to pale beige. *Streak:* White. *Luster:* Vitreous to somewhat pearly on {0001}. *Optical Class:* Uniaxial (-). $\omega = 1.728(3)$ $\epsilon = 1.542(1)$

Cell Data: *Space Group:* $P6_3/mmc$. $a = 5.0612(8)$ $c = 22.820(9)$ $Z = 2$

X-ray Powder Pattern: Mont Saint-Hilaire, Canada.

4.31 (100), 2.192 (90b), 3.169 (70), 2.534 (70), 1.978 (70), 2.877 (60), 5.71 (50)

Chemistry:

	(1)	(2)
CO ₂	[28.40]	28.94
La ₂ O ₃	16.36	
Ce ₂ O ₃	29.48	53.97
Pr ₂ O ₃	1.95	
Nd ₂ O ₃	5.88	
CaO	0.10	
SrO	0.12	
Na ₂ O	14.94	15.29
F	3.58	3.12
-O = F ₂	1.51	1.32
Total	[99.30]	100.00

(1) Mont Saint-Hilaire, Canada; by electron microprobe, average of five analyses on one grain, CO₂ calculated from crystal-structure analysis; corresponds to (Na_{2.99}Ca_{0.01}Sr_{0.01})_{Σ=3.01} (Ce_{1.11}La_{0.62}Nd_{0.22}Pr_{0.07})_{Σ=2.02}(CO₃)_{4.00}F_{1.17}. (2) Na₃Ce₂(CO₃)₄F.

Occurrence: A very rare mineral found in a pegmatite dike associated with an intrusive alkalic gabbro-syenite complex.

Association: Microcline, analcime, sodalite, aegirine, sérandite, eudialyte, catapleiite, fluorite, petersenite-(Ce), siderite, astrophyllite, albite.

Distribution: From Mont Saint-Hilaire, Quebec, Canada.

Name: To honor Professor Luke L.Y. Chang (1934–), University of Maryland, College Park, Maryland, USA, for his studies of carbonate minerals.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 81535.

References: (1) Grice, J.D. and G.Y. Chao (1997) Lukechangite-(Ce), a new rare-earth-fluorocarbonate mineral from Mont Saint-Hilaire, Quebec. *Amer. Mineral.*, 82, 1255–1260.