

Thomasclarkite-(Y) (Na, Ce)(Y, Ce, La, Nd)(HCO₃)(OH)₃•4H₂O

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Crystal Data: Monoclinic, pseudotetragonal. *Point Group:* 2. As blocky crystals, to 2 mm, showing {010}, {0 $\bar{1}$ 0}, {101}, {1 $\bar{0}$ 1}, {111}, {1 $\bar{1}$ 1}, {1 $\bar{1}$ 1}, {1 $\bar{1}$ 1}, singly and in groups. *Twining:* On {101}, ubiquitous.

Physical Properties: *Cleavage:* Perfect on {010}; a parting on {101}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 2–3 D(meas.) = 2.30(2) D(calc.) = 2.34

Optical Properties: Semitransparent. *Color:* White to yellow. *Streak:* White. *Luster:* Vitreous.

Optical Class: Biaxial (–), pseudouniaxial (–). $\alpha = 1.40(2)$ $\beta = 1.540(4)$ $\gamma = 1.540(4)$ 2V(meas.) = $\leq 5^\circ$

Cell Data: *Space Group:* P2. $a = 4.556(1)$ $b = 13.018(6)$ $c = 4.556(2)$ $\beta = 90.15(3)^\circ$ Z = 1

X-ray Powder Pattern: Mont Saint-Hilaire, Canada. 12.97 (10), 4.32 (5), 3.133 (5), 2.016 (4), 6.52 (3), 4.57 (3), 3.223 (3)

Chemistry:	(1)		(1)	
	CO ₂	12.00	Dy ₂ O ₃	2.04
	ThO ₂	0.54	Er ₂ O ₃	2.20
	Y ₂ O ₃	14.52	Yb ₂ O ₃	1.32
	La ₂ O ₃	8.63	CaO	0.33
	Ce ₂ O ₃	17.11	Na ₂ O	6.72
	Pr ₂ O ₃	1.92	F	0.17
	Nd ₂ O ₃	5.63	H ₂ O	26.60
	Sm ₂ O ₃	1.22	−O = F ₂	0.07
	Gd ₂ O ₃	1.22	Total	102.10

(1) Mont Saint-Hilaire, Canada; by electron microprobe, CO₂ and H₂O analyzed by TGA, (HCO₃)^{1–} and H₂O confirmed by IR; corresponds to (Na_{0.80}Ce_{0.18}Ca_{0.02})_{Σ=1.00}(Y_{0.48}Ce_{0.21}La_{0.20}Nd_{0.12}Pr_{0.04}Dy_{0.04}Er_{0.04}Sm_{0.03}Gd_{0.03}Yb_{0.03})_{Σ=1.22}(HCO₃)[(OH)_{2.97}F_{0.03}]_{Σ=3.00}•4.00H₂O.

Occurrence: Rarely in a pegmatite dike associated with an intrusive alkalic gabbro-syenite complex.

Association: Aegirine, albite, analcime, ancylite-(Ce), astrophyllite, calcite, catapleiite, dawsonite, elpidite, epididymite, franconite, gaidonnayite, galena, genthelvite, microcline, molybdenite, natrolite, petersenite-(Nd), polyolithionite, pyrochlore, rhodochrosite, rutile, sérandite, siderite, sphalerite, zircon.

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

Name: Honors Professor Thomas Henry Clark (1893–1996), McGill University, Montreal, Canada, who studied the geology of the area in which Mont Saint-Hilaire is situated.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 81553–81555.

References: (1) Grice, J.D. and R.A. Gault (1998) Thomasclarkite-(Y), a new sodium–rare-earth-element bicarbonate mineral species from Mont Saint-Hilaire, Quebec. Can. Mineral., 36, 1293–1300 (2) (1999) Amer. Mineral., 84, 1466 (abs. ref. 1)