

# Thomasclarkite-(Y) (Na, Ce)(Y, Ce, La, Nd)(HCO<sub>3</sub>)(OH)<sub>3</sub>•4H<sub>2</sub>O

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**Crystal Data:** Monoclinic, pseudotetragonal. *Point Group:* 2. As blocky crystals, to 2 mm, showing {010}, {0 $\bar{1}$ 0}, {101}, { $\bar{1}$ 01}, {111}, { $\bar{1}$ 11}, {1 $\bar{1}$ 1}, { $\bar{1}\bar{1}$ 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 (-), pseuduniaxial (-).  $\alpha = 1.40(2)$   $\beta = 1.540(4)$   $\gamma = 1.540(4)$   
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 <sub>2</sub>	12.00	Dy <sub>2</sub> O <sub>3</sub> 2.04
ThO <sub>2</sub>	0.54	Er <sub>2</sub> O <sub>3</sub> 2.20
Y <sub>2</sub> O <sub>3</sub>	14.52	Yb <sub>2</sub> O <sub>3</sub> 1.32
La <sub>2</sub> O <sub>3</sub>	8.63	CaO 0.33
Ce <sub>2</sub> O <sub>3</sub>	17.11	Na <sub>2</sub> O 6.72
Pr <sub>2</sub> O <sub>3</sub>	1.92	F 0.17
Nd <sub>2</sub> O <sub>3</sub>	5.63	H <sub>2</sub> O 26.60
Sm <sub>2</sub> O <sub>3</sub>	1.22	<u>-O = F<sub>2</sub> 0.07</u>
Gd <sub>2</sub> O <sub>3</sub>	1.22	Total 102.10

(1) Mont Saint-Hilaire, Canada; by electron microprobe, CO<sub>2</sub> and H<sub>2</sub>O analyzed by TGA, (HCO<sub>3</sub>)<sup>1-</sup> and H<sub>2</sub>O confirmed by IR; corresponds to (Na<sub>0.80</sub>Ce<sub>0.18</sub>Ca<sub>0.02</sub>) $\Sigma=1.00$ (Y<sub>0.48</sub>Ce<sub>0.21</sub>La<sub>0.20</sub>Nd<sub>0.12</sub>Pr<sub>0.04</sub>Dy<sub>0.04</sub>Er<sub>0.04</sub>Sm<sub>0.03</sub>Gd<sub>0.03</sub>Yb<sub>0.03</sub>) $\Sigma=1.22$ (HCO<sub>3</sub>)[(OH)<sub>2.97</sub>F<sub>0.03</sub>] $\Sigma=3.00$ •4.00H<sub>2</sub>O.

**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)