Charleshatchettite $CaNb_4O_{10}(OH)_2 \cdot 8H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As globules to 0.20 mm, composed of radiating bladed crystals elongated along [001].

Physical Properties: *Cleavage:* {100}, perfect. *Tenacity:* n.d.
Hardness = ~ 4 (by analogy to hochelagaite) D(meas.) = n.d. D(calc.) = 2.878

Optical Properties: Transparent to translucent. *Color*: White; colorless in transmitted light.
Luster: Silky.
Optical Class: Biaxial (–). $\alpha' = \sim 1.72(2) \perp \{100\}$ $\gamma' = \sim 1.82(2)$ along [001]

Cell Data: *Space Group*: *C*2/*c*. $a = 21.151(4)$ $b = 6.496(2)$ $c = 12.714(3)$ $\beta = 103.958(3)°$ $Z = 4$

X-ray Powder Pattern: Poudrette Quarry, Mont Saint-Hilaire, Québec, Canada.
10.308 (100), 4.731 (39), 4.832 (38), 3.262 (25), 3.193 (25), 3.108 (24), 4.556 (16)

Chemistry:	(1)	(2)
CaO	7.96	7.48
MgO	0.24	
Al_2O_3	0.13	
SiO_2	1.04	
TiO_2	3.64	
Nb_2O_5	68.07	70.90
H_2O	[22.96]	21.62
Total	104.04	100.00

(1) Poudrette Quarry, Mont Saint-Hilaire, Québec, Canada; average of 8 SEM-EDS analyses supplemented by Raman and FTIR spectroscopy, H_2O calculated from structure analysis; corresponds to $(Ca_{1.00}Mg_{0.04})_{\Sigma=1.04}(Nb_{3.62}Ti_{0.32}Si_{0.12}Al_{0.02})_{\Sigma=4.08}O_{10}(OH)_2 \cdot 8H_2O$.
(2) $CaNb_4O_{10}(OH)_2 \cdot 8H_2O$.

Mineral Group: Franconite group.

Occurrence: A late-stage mineral, probably developed from a niobium-rich precursor on a fracture surface in fine-grained nepheline syenite.

Association: Albite, quartz, muscovite, pyrrhotite, pyrite, ancylite-(Ce), siderite.

Distribution: Found in the Poudrette Quarry, Mont Saint-Hilaire, La Vallée-du-Richelieu, Montérégie (formerly Rouville County), Québec, Canada.

Name: Honors Charles Hatchett (1765-1847), an English chemist who discovered niobium, a dominant element in charleshatchettite.

Type Material: Canadian Museum of Nature, Gatineau, Québec, Canada (CMNMC 86894).

References: (1) Haring, M.M.M. and A.M. McDonald (2017) Charleshatchettite, $CaNb_4O_{10}(OH)_2 \cdot 8H_2O$, a new mineral from Mont Saint-Hilaire, Québec, Canada: Description, crystal-structure determination, and origin. Amer. Mineral., 102, 2333-2340.