

Bussyite-(Y)**(Y,REE,Ca)₃(Na,Ca)₆MnSi₉Be₅(O,OH,F)₃₄**

Crystal Data: Monoclinic. *Point Group:* 2. Crystals prismatic to bladed, blocky, sometimes radiating, to 3 mm, with rectangular cross sections.

Physical Properties: *Cleavage:* Perfect on {101}. *Fracture:* Splintery. *Tenacity:* Brittle. Hardness = ~ 4 D(meas.) = n.d. D(calc.) = 3.11

Optical Properties: Transparent to translucent. *Color:* Brown. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (-). $a = 1.583(2)$ $\beta = 1.593(2)$ $\gamma = 1.600(2)$ $2V(\text{meas.}) = 68(2)^\circ$ $2V(\text{calc.}) = 79^\circ$ *Orientation:* $Z \wedge c = 33^\circ$ (β obtuse); $Y = b$; $X = [101]$. Lamellar twinning || elongation in some crystals. *Pleochroism:* None.

Cell Data: *Space Group:* C2. $a = 11.600(3)$ $b = 13.856(3)$ $c = 16.516(4)$ $\beta = 95.84(1)^\circ$ $Z = 4$

X-ray Powder Pattern: Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada. 8.049 (100), 2.840 (50), 3.529 (38), 2.651 (38), 2.940 (35), 2.736 (30), 2.629 (30)

Chemistry:	(1)		(1)
Na ₂ O	8.21	Tb ₂ O ₃	0.31
K ₂ O	0.08	Dy ₂ O ₃	2.20
BeO	[9.75]	Ho ₂ O ₃	0.39
CaO	5.25	Er ₂ O ₃	0.93
MnO	2.93	Tm ₂ O ₃	0.16
BaO	0.03	Yb ₂ O ₃	0.46
FeO	0.40	Lu ₂ O ₃	0.01
Al ₂ O ₃	0.29	Nb ₂ O ₅	0.20
Y ₂ O ₃	7.58	SiO ₂	39.62
La ₂ O ₃	0.48	ThO ₂	2.12
Ce ₂ O ₃	2.66	F	3.49
Pr ₂ O ₃	0.55	Cl	0.03
Nd ₂ O ₃	2.85	H ₂ O	[5.10]
Sm ₂ O ₃	1.45	<u>-O = (F+Cl)₂</u>	<u>1.48</u>
Eu ₂ O ₃	0.13	Total	98.15
Gd ₂ O ₃	1.97		

(1) Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada; average of 3 electron microprobe analyses supplemented by IR spectroscopy, H₂O and BeO calculated; corresponding to (Y_{0.87}Nd_{0.22}Ce_{0.21}Dy_{0.15}Gd_{0.14}Sm_{0.11}Er_{0.06}Pr_{0.04}La_{0.04}Yb_{0.03}Ho_{0.03}Tb_{0.02}Tm_{0.01}Eu_{0.01}Ca_{0.79}Th_{0.11}) $\Sigma=2.84$ (Na_{3.45}Ca_{0.43}K_{0.02}) $\Sigma=3.90$ (Mn_{0.54}Fe_{0.07}) $\Sigma=0.61$ (Si_{8.59}Be_{5.08}Al_{0.07}) $\Sigma=13.74$ [O_{24.11}(OH)_{5.89}] $\Sigma=30$ [F_{2.39}(OH)_{1.60}Cl_{0.01}] $\Sigma=4$.

Occurrence: A late-stage hydrothermal product in alkaline pegmatite.

Association: Analcime, microcline, sérandite, calcite, cappelenite-(Y), catapleite, charmarite-2H and -3T, fluorite, helvine, kupletskite, perraultite, tainiolite.

Distribution: From the Poudrette quarry (level 7), Mont Saint-Hilaire, Rouville County, Quebec, Canada.

Name: The Y analog of bussyite-(Ce), which honors the French chemist and pharmacist Antoine Alexandre Brutus Bussy (1794-1882) who prepared magnesium and isolated the element beryllium.

Type Material: Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 86870).

References: (1) Grice, J.D., R. Rowe, and G. Poirier (2015) Bussyite-(Y), a new beryllium silicate mineral species from Mont Saint-Hilaire, Quebec. *Can. Mineral.*, 53(2), 235-248. (2) (2016) *Amer. Mineral.*, 101, 2355-2356 (abs. ref. 1).