Bussyite-(Y) $(Y,REE,Ca)_3(Na,Ca)_6MnSi_9Be_5(O,OH,F)_{34}$

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 (-). $\alpha = 1.583(2)$ $\beta = 1.593(2)$ $\gamma = 1.600(2)$ 2V(meas.) = 68(2)° 2V(calc.) = 79° *Orientation*: $Z \wedge c = 33°$ (β obtuse); $Y = b$; $X = [101]$. Lamellar twinning ‖ elongation in some crystals. *Pleochroism*: None.

Cell Data: *Space Group*: *C*2. $a = 11.600(3)$ $b = 13.856(3)$ $c = 16.516(4)$ $\beta = 95.84(1)°$ $Z = 4$

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_2O	8.21	Tb_2O_3	0.31
K_2O	0.08	Dy_2O_3	2.20
BeO	[9.75]	Ho_2O_3	0.39
CaO	5.25	Er_2O_3	0.93
MnO	2.93	Tm_2O_3	0.16
BaO	0.03	Yb_2O_3	0.46
FeO	0.40	Lu_2O_3	0.01
Al_2O_3	0.29	Nb_2O_5	0.20
Y_2O_3	7.58	SiO_2	39.62
La_2O_3	0.48	ThO_2	2.12
Ce_2O_3	2.66	F	3.49
Pr_2O_3	0.55	Cl	0.03
Nd_2O_3	2.85	H_2O	[5.10]
Sm_2O_3	1.45	$-O = (F+Cl)_2$	1.48
Eu_2O_3	0.13	Total	98.15
Gd_2O_3	1.97		

(1) Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada; average of 3 electron microprobe analyses supplemented by IR spectroscopy, H_2O 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), catapleiite, charmarite-2*H* and -3*T*, 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).