Bussyite-(Y) \((Y,\text{REE},\text{Ca})_3(\text{Na},\text{Ca})_6\text{MnSi}_9\text{Be}_5(\text{O},\text{OH},\text{F})_{34}\)

**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 (-).  
\[ \alpha = 1.583(2) \quad \beta = 1.593(2) \quad \gamma = 1.600(2) \quad 2V(\text{meas.}) = 68(2)^\circ \]

\[ 2V(\text{calc.}) = 79^\circ \quad \text{Orientation:} \ Z^\alpha = 33^\circ (\beta \ \text{obtuse}) ; \ Y = b; \ X = [101]. \]

**Pleochroism:** None.

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

**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:**

\[
\begin{align*}
\text{Na}_2\text{O} & \quad 8.21 & \text{Tb}_2\text{O}_3 & \quad 0.31 \\
\text{K}_2\text{O} & \quad 0.08 & \text{Dy}_2\text{O}_3 & \quad 2.20 \\
\text{BeO} & \quad [9.75] & \text{Ho}_2\text{O}_3 & \quad 0.39 \\
\text{CaO} & \quad 5.25 & \text{Er}_2\text{O}_3 & \quad 0.93 \\
\text{MnO} & \quad 2.93 & \text{Yb}_2\text{O}_3 & \quad 0.16 \\
\text{BaO} & \quad 0.03 & \text{Y}_2\text{O}_3 & \quad 0.46 \\
\text{FeO} & \quad 0.40 & \text{Lu}_2\text{O}_3 & \quad 0.01 \\
\text{Al}_2\text{O}_3 & \quad 0.29 & \text{Nb}_2\text{O}_5 & \quad 0.20 \\
\text{Y}_2\text{O}_3 & \quad 7.58 & \text{SiO}_2 & \quad 39.62 \\
\text{La}_2\text{O}_3 & \quad 0.48 & \text{Th}_2\text{O}_3 & \quad 2.12 \\
\text{Ce}_2\text{O}_3 & \quad 2.66 & \text{F} & \quad 3.49 \\
\text{Pr}_2\text{O}_3 & \quad 0.55 & \text{Cl} & \quad 0.03 \\
\text{Nd}_2\text{O}_3 & \quad 2.85 & \text{H}_2\text{O} & \quad [5.10] \\
\text{Sm}_2\text{O}_3 & \quad 1.45 & \text{O} = (\text{F}+\text{Cl})_2 & \quad 1.48 \\
\text{Eu}_2\text{O}_3 & \quad 0.13 & \text{Total} & \quad 98.15 \\
\end{align*}
\]

(1) Poudrette quarry, Mont Saint-Hilaire, Rouville County, Quebec, Canada; average of 3 electron microprobe analyses supplemented by IR spectroscopy, \(\text{H}_2\text{O}\) and \(\text{BeO}\) calculated; corresponding to \((\text{Y}_{0.87}\text{Nd}_{0.22}\text{Ce}_{0.07}\text{Dy}_{0.19}\text{Gd}_{0.17}\text{Sm}_{0.15}\text{Er}_{0.08}\text{Pr}_{0.08}\text{La}_{0.04}\text{Yb}_{0.02}\text{Ho}_{0.01}\text{Tb}_{0.02}\text{Er}_{0.01}\text{Nd}_{0.01}\text{Ca}_{0.79}\text{Th}_{0.01})_2\times 2.84 (\text{Na}_{0.38}\text{Ca}_{0.28}\text{K}_{0.02})_2\times 3.00 (\text{Mn}_{0.84}\text{Fe}_{0.07})_2\times 4.00 (\text{Si}_{0.39}\text{Be}_{0.09}\text{Al}_{0.07})_2\times 13.74 (\text{O}_{24.11})_2\times 1.80 [\text{F}_{2.39}(\text{OH})_{1.60}\text{Cl}_{0.01}]_2\times 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, helvite, kupletskeite, 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).