

**Bussyite-(Ce)** **(Ce,REE,Ca)<sub>3</sub>(Na,H<sub>2</sub>O)<sub>6</sub>MnSi<sub>9</sub>Be<sub>5</sub>(O,OH)<sub>30</sub>(F,OH)<sub>4</sub>**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. Crystals, prismatic on [101], to 10 mm, exhibiting forms {1 1  $\bar{1}$  }, {1 0  $\bar{1}$  }; as crystal sprays. *Twining:* Fine lamellar, parallel elongation.

**Physical Properties:** *Cleavage:* Perfect on {1 0  $\bar{1}$  }. *Fracture:* Splintery. *Tenacity:* Brittle. Hardness = 4 D(meas.) = 3.00. D(calc.) = 3.11

**Optical Properties:** Transparent to translucent. *Color:* Pale pinkish orange. *Streak:* White. *Luster:* Vitreous.

*Optical Class:* Biaxial (-).  $\alpha = 1.574(2)$   $\beta = 1.591(2)$   $\gamma = 1.597(2)$   $2V(\text{meas.}) = 63(2)^\circ$   $2V(\text{calc.}) = 61^\circ$  *Orientation:* X  $\wedge$  c =  $39^\circ$  ( $\beta$  acute); Y = b; Z  $\wedge$  a =  $44.5^\circ$  ( $\beta$  obtuse).

**Cell Data:** *Space Group:* C2/c. a = 11.654(3) b = 13.916(3) c = 16.583(4)  $\beta = 95.86(2)^\circ$  Z = 4

**X-ray Powder Pattern:** Poudrette dike, Mont Saint-Hilaire, Quebec, Canada. 8.120 (100), 2.863 (48), 3.543 (39), 2.668 (33), 6.959 (26), 2.959 (24), 2.749 (23)

|                                |      |                                |       |
|--------------------------------|------|--------------------------------|-------|
| <b>Chemistry:</b>              | (1)  |                                | (2)   |
| Na <sub>2</sub> O              | 7.63 | Sm <sub>2</sub> O <sub>3</sub> | 0.99  |
| K <sub>2</sub> O               | 0.05 | Gd <sub>2</sub> O <sub>3</sub> | 1.03  |
| BeO                            | 8.33 | Er <sub>2</sub> O <sub>3</sub> | 0.01  |
| CaO                            | 5.35 | Yb <sub>2</sub> O <sub>3</sub> | 1.97  |
| MgO                            | 0.03 | SiO <sub>2</sub>               | 38.66 |
| MnO                            | 2.49 | ThO <sub>2</sub>               | 3.31  |
| Al <sub>2</sub> O <sub>3</sub> | 0.82 | F                              | 3.67  |
| Y <sub>2</sub> O <sub>3</sub>  | 1.97 | S                              | 0.03  |
| La <sub>2</sub> O <sub>3</sub> | 2.65 | H <sub>2</sub> O               | 4.12  |
| Ce <sub>2</sub> O <sub>3</sub> | 9.77 | -O=F                           | 1.55  |
| Pr <sub>2</sub> O <sub>3</sub> | 1.23 | -O=S                           | 0.01  |
| Nd <sub>2</sub> O <sub>3</sub> | 4.54 | Total                          | 95.21 |

(1) Poudrette dike, Mont Saint-Hilaire, Quebec, Canada; average of 26 electron microprobe analyses, H<sub>2</sub>O calculated from structural analysis, IR confirms OH and H<sub>2</sub>O, corresponding to (Ce<sub>0.823</sub>Nd<sub>0.373</sub>Y<sub>0.242</sub>Th<sub>0.173</sub>Pr<sub>0.103</sub>Sm<sub>0.079</sub>Gd<sub>0.078</sub>Eu<sub>0.008</sub>) $\Sigma=1.89$ (Ca<sub>0.775</sub>La<sub>0.225</sub>) $\Sigma=1$  [Na<sub>3.000</sub>(H<sub>2</sub>O)<sub>2.500</sub>Ca<sub>0.544</sub>K<sub>0.015</sub>] $\Sigma=6.055$ (Mn<sub>0.485</sub>Na<sub>0.402</sub>Mg<sub>0.012</sub>) $\Sigma=0.899$ (Si<sub>8.897</sub>Be<sub>4.605</sub>Al<sub>0.222</sub>) $\Sigma=13.724$  O<sub>30</sub>[F<sub>2.67</sub>(OH)<sub>1.33</sub>] $\Sigma=4$ .

**Occurrence:** A late-stage hydrothermal mineral associated with a nepheline syenite-hosted pegmatite.

**Association:** Serandite, aegirine, albite, analcime, ancylite-(Ce), calcite, catapleiite, gonnardite, kupletskite, leucophanite, microcline, nenadkevichite, polyolithionite, sphalerite.

**Distribution:** Poudrette pegmatite dike, Mont Saint-Hilaire, Quebec, Canada.

**Name:** Honors Antoine Alexandre Brutus Bussy (1794-1882), co-discoverer of beryllium.

**Type Material:** Canadian Museum of Nature, Ottawa, Ontario, Canada (catalog no. CMNMC 85929).

**References:** (1) Grice, J.D., R. Rowe, G. Poirier, A. Pratt, and J. Francis (2009) Bussyite-(Ce), a new beryllium silicate mineral species from Mont Saint-Hilaire, Quebec. *Can. Mineral.*, 47, 193–204. (2) (2009) *Amer. Mineral.*, 94, 1496 (abs. ref. 1).