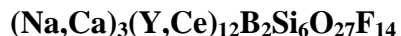


**Okanoganite-(Y)**

**Crystal Data:** Hexagonal. *Point Group:* 3m. As twinned pseudotetrahedral crystals, to 4 mm, and groups of such crystals. *Twinning:* With twin plane (0114), producing fourlings, the (0001) face of each individual crystal forming the faces of a pseudotetrahedron.

**Physical Properties:** Hardness = 4 D(meas.) = 4.35(4) D(calc.) = 4.96

**Optical Properties:** Transparent to translucent. *Color:* Tan to pale pink; colorless in thin fragments. *Streak:* White.

*Optical Class:* Uniaxial (-).  $\omega = 1.753(2)$   $\varepsilon = 1.740(2)$

**Cell Data:** Space Group: *R3m*.  $a = 10.7108(5)$   $c = 27.0398(11)$   $Z = 3$

**X-ray Powder Pattern:** Golden Horn batholith, Washington, USA.  
2.970 (100), 2.939 (95), 2.926 (50), 3.11 (48), 1.784 (43), 4.35 (41), 1.978 (35)

<b>Chemistry:</b>	(1)
SiO <sub>2</sub>	14.35
TiO <sub>2</sub>	0.50
B <sub>2</sub> O <sub>3</sub>	3.1
Y <sub>2</sub> O <sub>3</sub>	20.46
RE <sub>2</sub> O <sub>3</sub>	44.29
FeO	1.60
PbO	0.63
CaO	3.24
Na <sub>2</sub> O	2.74
F	11.15
<u>-O = F<sub>2</sub></u>	<u>4.69</u>
Total	97.37

(1) Golden Horn batholith, Washington, USA; by electron microprobe, B by spectrophotometer, RE<sub>2</sub>O<sub>3</sub> = La<sub>2</sub>O<sub>3</sub> 5.88%, Ce<sub>2</sub>O<sub>3</sub> 15.42%, Pr<sub>2</sub>O<sub>3</sub> 1.83%, Nd<sub>2</sub>O<sub>3</sub> 7.70%, Sm<sub>2</sub>O<sub>3</sub> 1.64%, Gd<sub>2</sub>O<sub>3</sub> 5.28%, Tb<sub>2</sub>O<sub>3</sub> 0.44%, Dy<sub>2</sub>O<sub>3</sub> 2.08%, Ho<sub>2</sub>O<sub>3</sub> 0.96%, Er<sub>2</sub>O<sub>3</sub> 1.26%, Tm<sub>2</sub>O<sub>3</sub> 0.20%, Yb<sub>2</sub>O<sub>3</sub> 0.79%, Lu<sub>2</sub>O<sub>3</sub> 0.81%; corresponds to (Na<sub>2.13</sub>Ca<sub>0.80</sub>Pb<sub>0.07</sub>) $\Sigma=3.00$ [(Y,RE)<sub>10.64</sub>Ca<sub>0.59</sub>Fe<sub>0.54</sub>] $\Sigma=11.77$ B<sub>2.15</sub>(Si<sub>5.76</sub>Ti<sub>0.15</sub>) $\Sigma=5.91$ O<sub>27</sub>F<sub>14.15</sub>.

**Occurrence:** In miarolitic cavities in a peralkalic arfvedsonite-bearing granite.

**Association:** Quartz, microcline, zircon, arfvedsonite, bastnäsite, zektzerite, astrophyllite.

**Distribution:** From the Golden Horn batholith, near Washington Pass, Okanogan Co., Washington, USA.

**Name:** For Okanogan Co., Washington, USA, and the yttrium content.

**Type Material:** National Museum of Natural History, Washington, D.C., USA; 142512-142514.

**References:** (1) Boggs, R. (1980) Okanoganite, a new rare-earth borofluorosilicate from the Golden Horn batholith, Okanogan County, Washington. *Amer. Mineral.*, 65, 1138-1142.  
(2) Boiocchi, M., A. Callegari, L. Ottolini, and A. Maras (2004) The chemistry and crystal structure of okanoganite-(Y) and comparison with vicanite-(Ce). *Amer. Mineral.*, 89, 1540-1545.  
(3) (2005) *Amer. Mineral.*, 90, 772-773 (abs. ref. 2).