

Okanoganite-(Y)**(Na, Ca)₃(Y, Ce)₁₂B₂Si₆O₂₇F₁₄**

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Crystal Data: Hexagonal. *Point Group:* 3, $\bar{3}$, 32, 3*m*, or $\bar{3}2/m$ possible. As twinned pseudotetrahedral crystals, to 4 mm, and groups of such crystals. *Twining:* With twin plane {011 $\bar{4}$ }, 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.) = 4.37

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

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

Cell Data: *Space Group:* *R*3, $R\bar{3}$, *R*32, *R*3*m*, $R\bar{3}m$, *R*3*c*, or $R\bar{3}c$ possible. $a = 10.72(1)$
 $c = 27.05(8)$ $Z = 3$

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)

Chemistry:

	(1)
SiO ₂	14.35
TiO ₂	0.50
B ₂ O ₃	3.1
Y ₂ O ₃	20.46
RE ₂ O ₃	44.29
FeO	1.60
PbO	0.63
CaO	3.24
Na ₂ O	2.74
F	11.15
-O = F ₂	4.69
Total	97.37

(1) Golden Horn batholith, Washington, USA; by electron microprobe, B by spectrophotometer, RE₂O₃ = La₂O₃ 5.88%, Ce₂O₃ 15.42%, Pr₂O₃ 1.83%, Nd₂O₃ 7.70%, Sm₂O₃ 1.64%, Gd₂O₃ 5.28%, Tb₂O₃ 0.44%, Dy₂O₃ 2.08%, Ho₂O₃ 0.96%, Er₂O₃ 1.26%, Tm₂O₃ 0.20%, Yb₂O₃ 0.79%, Lu₂O₃ 0.81%; corresponds to (Na_{2.13}Ca_{0.80}Pb_{0.07})_{Σ=3.00}[(Y, RE)_{10.64}Ca_{0.59}Fe_{0.54}]_{Σ=11.77}B_{2.15}(Si_{5.76}Ti_{0.15})_{Σ=5.91}O₂₇F_{14.15}

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.