

# Natroapophyllite

# NaCa<sub>4</sub>Si<sub>8</sub>O<sub>20</sub>F•8H<sub>2</sub>O

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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$  or  $mm2$ . As composite crystals, euhedral to subhedral, to 1 mm, with prismatic {100} and truncated by {111}, striated  $\perp$  [001].

**Physical Properties:** *Cleavage:* Perfect on {001}, poor on {110}. *Hardness* = 4–5  
D(meas.) = 2.50, including contaminants. D(calc.) = 2.30

**Optical Properties:** Transparent to translucent. *Color:* Colorless to white, brownish yellow to yellowish brown; colorless in thin section. *Streak:* Light gray. *Luster:* Vitreous to pearly.  
*Optical Class:* Biaxial (+). *Dispersion:*  $r < v$ .  $\alpha = 1.536(2)$   $\beta = 1.538(2)$   $\gamma = 1.544(2)$   
 $2V(\text{meas.}) = 32(1)^\circ$

**Cell Data:** *Space Group:*  $Pn\bar{n}m$  or  $Pnn2$ .  $a = 8.875(4)$   $b = 8.881(6)$   $c = 15.79(1)$   
 $Z = 2$

**X-ray Powder Pattern:** Sampo mine, Japan.  
3.96 (100), 2.98 (63), 2.48 (24), 7.83 (20), 4.54 (19), 7.77 (18), 2.50 (18)

<b>Chemistry:</b>	(1)
SiO <sub>2</sub>	52.79
Al <sub>2</sub> O <sub>3</sub>	0.00
CaO	25.41
Na <sub>2</sub> O	3.05
K <sub>2</sub> O	0.33
F	2.27
H <sub>2</sub> O	[17.11]
–O = F <sub>2</sub>	0.96
Total	[100.00]

(1) Sampo mine, Japan; by electron microprobe, H<sub>2</sub>O by difference; corresponds to  
(Na<sub>0.90</sub>K<sub>0.06</sub>) $_{\Sigma=0.96}$ Ca<sub>4.13</sub>Si<sub>8</sub>O<sub>20.07</sub>F<sub>1.09</sub>•8.6H<sub>2</sub>O.

**Occurrence:** In skarns, banded between granite and marble, of a contact metamorphic mineral deposit.

**Association:** Zeophyllite, cuspidine, apophyllite, calcite, andradite, xonotlite, wollastonite, clinopyroxene, magnetite, quartz, bismuth.

**Distribution:** At the Sampo mine, 10 km west of Takahashi, Okayama Prefecture, Japan.

**Name:** For sodium, *natrium*, in the composition, and its relation to other *apophyllite* species.

**Type Material:** National Science Museum, Tokyo, M21067; Institute of Mining Geology, Akita University, Akita, Japan; National Museum of Natural History, Washington, D.C., USA, 136398.

**References:** (1) Matsueda, H., Y. Miura, and J. Rucklidge (1981) Natroapophyllite, a new orthorhombic sodium analog of apophyllite: I. Description, occurrence, and nomenclature. *Amer. Mineral.*, 66, 410–415. (2) Miura, Y., T. Kato, J. Rucklidge, and H. Matsueda (1981) Natroapophyllite, a new orthorhombic sodium analog of apophyllite II. Crystal structure. *Amer. Mineral.*, 66, 416–423.