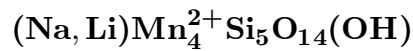


Natronambulite



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Crystal Data: Triclinic. *Point Group:* 1 or $\bar{1}$. Tabular prismatic crystals, to 6 cm; also as coarse-grained mosaic aggregates.

Physical Properties: *Cleavage:* Perfect on {100} and {001}, distinct on {010}.
Hardness = 5.5–6 D(meas.) = 3.51 D(calc.) = 3.50

Optical Properties: Transparent. *Color:* Pinkish orange to pink, deep red; in thin section, very pale yellow. *Streak:* White, with slight orange tint. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Dispersion:* $r > v$, distinct. *Absorption:* $Z > Y = X$.
 $\alpha = 1.703\text{--}1.706$ $\beta = 1.710\text{--}1.712$ $\gamma = 1.726\text{--}1.730$ $2V(\text{meas.}) = 45^\circ\text{--}48^\circ$

Cell Data: *Space Group:* $P1$ or $P\bar{1}$. $a = 7.620$ $b = 11.762$ $c = 6.737$ $\alpha = 92.81^\circ$
 $\beta = 94.55^\circ$ $\gamma = 106.87^\circ$ $Z = [2]$

X-ray Powder Pattern: Tanohata mine, Japan.
3.559 (100), 7.13 (47), 3.078 (45), 6.70 (44), 3.348 (40), 2.506 (38), 2.972 (34)

Chemistry:

	(1)	(2)
SiO ₂	49.20	48.97
FeO	0.11	0.15
MnO	39.46	40.30
MgO	1.11	2.16
CaO	3.42	2.87
Li ₂ O	0.44	0.98
Na ₂ O	4.14	3.12
H ₂ O ⁺	1.48	1.50
H ₂ O ⁻		0.20
Total	99.36	100.25

(1) Tanohata mine, Japan; by electron microprobe, Li and H₂O by wet chemical analysis; corresponds to $(\text{Na}_{0.82}\text{Li}_{0.18})_{\Sigma=1.00}(\text{Mn}_{3.41}\text{Ca}_{0.37}\text{Mg}_{0.17}\text{Fe}_{0.01})_{\Sigma=3.96}\text{Si}_{5.02}\text{O}_{14.00}(\text{OH})_{1.00}$.

(2) Kombat mine, Namibia; corresponds to $(\text{Na}_{0.61}\text{Li}_{0.40})_{\Sigma=1.01}(\text{Mn}_{3.45}\text{Mg}_{0.33}\text{Ca}_{0.31}\text{Fe}_{0.01})_{\Sigma=4.10}\text{Si}_{4.95}\text{O}_{13.99}(\text{OH})_{1.01}$.

Polymorphism & Series: Forms a series with nambulite.

Occurrence: In banded ore of a contact metamorphosed bedded manganese deposit, and as an accessory mineral in an albite-microcline-quartz pegmatite cutting the ore (Tanohata mine, Japan).

Association: Aegirine, manganoan arfvedsonite, rhodonite, kôzulite, marsturite, sérandite, quartz, albite, microcline (Tanohata mine, Japan); gypsum, brushite, cahnite, chlorite, kentrolite, barite, calcite (Kombat mine, Namibia).

Distribution: From the Tanohata mine, Iwate Prefecture, Japan. At the Kombat mine, 49 km south of Tsumeb, Namibia.

Name: For sodium, *natrium*, in its composition, and its relation to *nambulite*.

Type Material: National Science Museum, Tokyo, Japan, M23817.

References: (1) Matsubara, S., A. Kato, and T. Tiba (1985) Natronambulite, (Na, Li) (Mn, Ca)₄Si₅O₁₄OH, a new mineral from the Tanohata mine, Iwate Prefecture, Japan. *Mineral. J. (Japan)*, 12, 332–340. (2) (1987) *Amer. Mineral.*, 72, 224 (abs. ref. 1). (3) von Knorring, O., T.G. Sahama, and R. Törnroos (1978) Second find of nambulite. *Neues Jahrb. Mineral., Monatsh.*, 346–348.

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