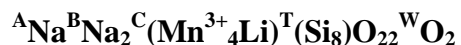


Oxo-mangani-leakeite

Crystal Data: Monoclinic. *Point Group:* 2/m. Crystals prismatic.

Physical Properties: *Cleavage:* Perfect on {110}. *Fracture:* n.d. *Tenacity:* Brittle.
Hardness = [6] D(meas.) = n.d. D(calc.) = 3.25

Optical Properties: Transparent. *Color:* Red-orange. *Streak:* n.d. *Luster:* Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.681(2)$ $\beta = 1.712(2)$ $\gamma = 1.738(2)$ $2V(\text{meas.}) = 81.0(4)^\circ$
 $2V(\text{calc.}) = 83.5^\circ$ *Orientation:* $X \wedge c = 51.5^\circ$ (β acute), $Z // b$, $Y \wedge a = 66.3^\circ$ (β obtuse).
Pleochroism: $X = \text{red-brown}$, $Y = Z = \text{orange-red}$. *Absorption:* $X > Z = Y$.

Cell Data: *Space Group:* C2/m. $a = 9.875(5)$ $b = 17.873(9)$ $c = 5.295(2)$ $\beta = 104.74(3)^\circ$ $Z = 2$

X-ray Powder Pattern: Hoskins Mine, New South Wales, Australia.
8.423 (100), 3.377 (46), 4.461 (40), 4.451 (40), 3.134 (37), 2.694 (37), 2.282 (27)

Chemistry:	(1)	(2)
SiO ₂	53.53	53.15
TiO ₂	0.28	
Al ₂ O ₃	0.29	
Fe ₂ O ₃	[3.91]	
Mn ₂ O ₃	[20.46]	34.91
MgO	7.20	
ZnO	0.13	
NiO	0.06	
Li ₂ O	0.96	1.66
CaO	0.36	
Na ₂ O	8.96	10.28
K ₂ O	1.90	
H ₂ O	[0.64]	
Total	98.68	100.00

(1) Hoskins Mine, New South Wales, Australia; average microprobe analysis, H₂O, Fe₂O₃ and Mn₂O₃ calculated from structure, Li₂O (by SIMS); corresponding to ${}^A(\text{Na}_{0.65}\text{K}_{0.36})_{\Sigma=1.01}$ ${}^B(\text{Na}_{1.94}\text{Ca}_{0.06})_{\Sigma=2.00}$ ${}^C(\text{Mg}_{1.60}\text{Zn}_{0.01}\text{Mn}^{3+}_{2.32}\text{Fe}^{3+}_{0.44}\text{Al}_{0.03}\text{Ti}^{4+}_{0.03}\text{Li}_{0.58})_{\Sigma=5.01}$ ${}^T(\text{Si}_{7.98}\text{Al}_{0.02})_{\Sigma=8.00}\text{O}_{22}$ ${}^W[\text{O}_{1.34}(\text{OH})_{0.66}]_{\Sigma=2.00}$. (2) ${}^A\text{Na}{}^B\text{Na}_2{}^C(\text{Mn}^{3+}{}_4\text{Li}){}^T\text{Si}_8\text{O}_{22}{}^W\text{O}_2$.

Mineral Group: Amphibole group, oxo-amphibole subgroup.

Occurrence: In the oxidized portions of a manganese deposit, most likely a metamorphosed (upper middle to middle greenschist facies) submarine exhalative deposit.

Association: Namansilite, aegirine, manganoan pectolite-serandite, braunite, norrishite, calcium and barium carbonates, quartz, albite, potassium feldspar, Mn-bearing sugilite, barite.

Distribution: From the Hoskins Mine, ~ 3 km west of Grenfell, New South Wales, Australia.

Name: Signifies an amphibole in the compositional range of *leakeite* with dominant manganese in the C structural site and dominant oxygen in the W site.

Type Material: Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 86895).

References: (1) Oberti, R., M. Boiocchi, F.C. Hawthorne, N.A. Ball, and P.M. Ashley (2016) Oxo-mangani-leakeite from the Hoskins mine, New South Wales, Australia: occurrence and mineral description. *Mineral. Mag.*, 80(6), 1013-1021. (2) (2017) *Amer. Mineral.*, 102, 697 (abs. ref. 1).