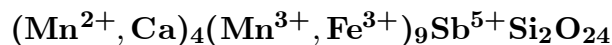


Långbanite



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Crystal Data: Hexagonal or monoclinic. *Point Group:* $3m$ or $2/m$. As short to long prismatic crystals, to 1 cm, vertically striated $\parallel \{11\bar{2}0\}$.

Physical Properties: *Cleavage:* Good cleavage or parting on $\{0001\}$. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 6.5 D(meas.) = 4.92–4.94 D(calc.) = 4.97

Optical Properties: Opaque. *Color:* Iron-black. *Streak:* Dark reddish brown. *Luster:* Metallic, brilliant. *Optical Class:* Uniaxial (-). $\omega = 2.36$ (Li). $\epsilon = 2.31$

Cell Data: *Space Group:* $P31m$. $a = 11.563(2)$ $c = 11.100(2)$ $Z = 3$, or *Space Group:* $C2/m$. $a = 11.561(5)$ $b = 20.05(1)$ $c = 11.075(9)$ $\beta = 90.03(5)^\circ$ $Z = 6$

X-ray Powder Pattern: Långban, Sweden. (ICDD 14-195). 2.55 (100), 2.745 (90), 2.80 (80), 1.54 (80), 1.67 (70), 1.43 (50), 1.99 (40)

Chemistry:

	(1)	(2)
SiO ₂	10.88	9.14
Fe ₂ O ₃		8.56
Mn ₂ O ₃		44.21
Y ₂ O ₃		0.06
Sb ₂ O ₅	15.42	14.36
FeO	10.32	
MnO	64.00	21.96
CaO		1.11
Total	100.62	99.40

(1) Långban, Sweden. (2) Do.; by electron microprobe, average of eight analyses; corresponding to $(\text{Mn}_{3.73}^{2+}\text{Ca}_{0.26}\text{Y}_{0.01})_{\Sigma=4.00}(\text{Mn}_{7.23}^{3+}\text{Fe}_{1.38}^{3+}\text{Mn}_{0.27}^{2+}\text{Sb}_{0.15})_{\Sigma=9.03}\text{Sb}_{1.00}\text{Si}_{1.97}\text{O}_{24}$.

Occurrence: In crystalline limestones and manganese-rich skarns in metamorphosed manganese deposits.

Association: Manganoan aegirine, richterite, braunite, magnetite, hausmannite, rhodonite, hedyphane.

Distribution: From Långban, Värmland, and the Sjö mine, near Grythyttan, Örebro, Sweden. In the Gozaisho mine, Fukushima Prefecture, Japan.

Name: For the place of its original discovery, Långban, Sweden.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 543–544, 1039–1040. (2) Giuseppetti, G., F. Mazzi, and C. Tadini (1991) The crystal structure of monoclinic langbanite: $(\text{Mn}, \text{Ca}, \text{Fe}, \text{Mg})_4^{2+}(\text{Mn}, \text{Fe})_9^{3+}\text{Sb}^{5+}[\text{O}_{16}(\text{SiO}_4)_2]$. Neues Jahrb. Mineral., Monatsh., 193–211. (3) Moore, P.B., P.K. Sen Gupta, and Y. Le Page (1991) The remarkable långbanite structure type: crystal structure, chemical crystallography, and relation to some other cation close-packed structures. Amer. Mineral., 76, 1408–1425.