

Roymillerite**Pb₂₄Mg₉(Si₉AlO₂₈)(SiO₄)(BO₃)(CO₃)₁₀(OH)₁₄O₄**

Crystal Data: Triclinic. *Point group:* $\bar{1}$. As platy grains that display {001} and in aggregates to 1.5 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Tenacity:* Flexible, non-elastic.
Fracture: Uneven. Hardness = ~3 D(meas.) = n.d. D(calc.) = 5.973

Optical Properties: Transparent. *Color:* Colorless to light pink. *Streak:* White.
Luster: Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.86(1)$ $\beta \approx \gamma = 1.94(1)$ $2V(\text{meas.}) = 5(5)^\circ$ *Orientation:* $X \approx c$.

Cell Data: *Space Group:* $P\bar{1}$. $a = 9.3152(15)$ $b = 9.3164(15)$ $c = 26.463(4)$ $\alpha = 83.295(3)^\circ$
 $\beta = 83.308(3)^\circ$ $\gamma = 60.023(2)^\circ$ $Z = 2$

X-ray Powder Pattern: Kombat mine, Otavi Valley, Grootfontein district, northern Namibia.
25.9 (100), 3.282 (16), 2.684 (16), 3.378 (14), 3.480 (12), 3.185 (12), 13.1 (11)

Chemistry:	(1)	(2)
SiO ₂	7.90	7.82
MgO	4.93	5.25
MnO	1.24	
FeO	0.95	
PbO	75.38	77.50
B ₂ O ₃	[0.50]	0.50
Al ₂ O ₃	0.74	0.74
CO ₂	5.83	6.37
H ₂ O	1.8	1.82
Total	99.27	100.00

(1) Kombat mine, Otavi Valley, Grootfontein district, northern Namibia; average of 7 electron microprobe analyses, supplemented by IR spectroscopy, H₂O and CO₂ by gas chromatography, B₂O₃ calculated from structure; corresponds to Pb_{24.12}Mg_{8.74}Mn_{1.25}Fe_{0.94}B_{1.03}Al_{1.04}C_{9.46}Si_{9.39}H_{14.27}O₈₃.
(2) Pb₂₄Mg₉(Si₉AlO₂₈)(SiO₄)(BO₃)(CO₃)₁₀(OH)₁₄O₄.

Occurrence: In locally Pb-Cu-rich, non-sulfide portions of an Fe-Mn oxide deposit.

Association: Rhodochrosite, cerussite, jacobsonite, hausmannite, sahlinite, barite, grootfonteinite, Mn-Fe oxides, melanotekite.

Distribution: From the Kombat mine, Otavi Valley, 49 km south of Tsumeb, Grootfontein district, Otjozondjupa region, northern Namibia.

Name: Honors Dr. Roy McGillivray Miller (b. 1941) for his contributions to the knowledge of the geology of Namibia.

Type Material: Swedish Museum of Natural History, Stockholm, Sweden (20080176).

References: (1) Chukanov, N.V., E. Jonsson, S.M. Aksenov, S.N. Britvin, R.K. Rastsvetaeva, D.I. Belakovskiy, and K.V. Van (2017) Roymillerite, Pb₂₄Mg₉(Si₉AlO₂₈)(SiO₄)(BO₃)(CO₃)₁₀(OH)₁₄O₄, a new mineral: mineralogical characterization and crystal chemistry. *Phys. Chem. Minerals*, 44(10), 685-699. (2) (2018) *Amer. Mineral.*, 103, 2043-2044 (abs. ref. 1).