

Mendozavilite-NaCu

Crystal Data: Monoclinic. *Point Group:* $2/m$. As six-sided, pseudo-hexagonal, tabular crystals to 1 mm. Forms include {001} (dominant), {110}, {111}, and {110}. *Twinning:* Ubiquitous by contact on {001} and penetration, both by rotation of 120° about [102].

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Irregular. *Tenacity:* Slightly flexible; not elastic. Hardness = ~ 2.5 D(meas.) = 2.824(5) D(calc.) = 2.824

Optical Properties: Transparent. *Color:* Lime green. *Streak:* Colorless to very pale green. *Luster:* Vitreous to subadamantine.

Optical Class: Biaxial (+). *Pleochroism:* In pale olive greens. *Dispersion:* $r < v$, strong, inclined. *Absorption:* $Y > X = Z$. $\alpha = 1.770(5)$ $\beta = 1.785(5)$ $\gamma = 1.805(5)$ $2V(\text{meas.}) = 80(10)^\circ$ $2V(\text{calc.}) = 82.6^\circ$ *Orientation:* $Y = b, X \approx c, Z \approx a^*$.

Cell Data: *Space Group:* $C2/m$. $a = 18.9984(16)$ $b = 10.9296(7)$ $c = 15.0818(12)$ $\beta = 129.906(2)^\circ$ $Z = 2$

X-ray Powder Pattern: Lomas Bayas mine, Antofagasta Province, Chile.

8.841 (100), 7.330 (37), 3.007 (25), 1.769 (22), 2.932 (21), 2.743 (20), 3.132 (19)

Chemistry:	(1)	(1)
Na ₂ O	2.44	Al ₂ O ₃ 0.02
K ₂ O	0.07	SiO ₂ 0.02
CaO	0.10	P ₂ O ₅ 6.49
CuO	4.18	MoO ₃ 56.36
MgO	0.52	H ₂ O <u>[22.94]</u>
Fe ₂ O ₃	11.06	Total 99.99

(1) Lomas Bayas mine, Antofagasta Province, Chile; normalized electron microprobe analysis, H₂O calculated, corresponds to $[(\text{Na}_{1.61}\text{Mg}_{0.27}\text{Ca}_{0.04}\text{K}_{0.03}\text{Cu}^{2+}_{0.07})_{\Sigma=2.02}(\text{H}_2\text{O})_{13.39}\text{Cu}^{2+}(\text{H}_2\text{O})_6][\text{Mo}_8(\text{P}_{1.87}\text{Si}_{0.01})_{\Sigma=1.88}(\text{Fe}^{3+}_{2.83}\text{Al}_{0.01})_{\Sigma=2.84}\text{O}_{33.31}(\text{OH})_{3.69}]$.

Mineral Group: Betpakdalite supergroup, mendozavilite group.

Occurrence: In the oxidized zone of porphyry copper deposit as thin vein fillings and well-formed crystals in cavities.

Association: Quartz, feruvite, muscovite (sericite), pyrite, chalcopyrite, covellite, djurleite, molybdenite, anhydrite, jarosite, mendozavilite-NaFe, natrochalcite, sampleite, strengite.

Distribution: From the Lomas Bayas mine, 93 km east northeast of Antofagasta, Antofagasta Province, Chile.

Name: Honors Heriberto *Mendoza Avila* (b. 1924), Phelps Dodge exploration geologist, who found the first specimen. Two suffixes correspond to the dominant cations in the two different types of non-framework cation sites.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (60483, 60484, 60485 and 60486).

References: (1) Williams, S. A. (1986) Mendozavilite and paramendozavilite, two new minerals from Cumobabi, Sonora. *Boletín de Mineralogía*, 2(1), 13-19. (2) (1988) *Amer. Mineral.*, 73, 193 (abs. ref. 1). (3) Kampf, A.R., S.J. Mills, M.S. Rumsey, M. Dini, W.D. Birch, J. Spratt, J.J. Pluth, I.M. Steele, R.A. Jenkins, and W.W. Pinch (2012) The heteropolymolybdate family: structural relations, nomenclature scheme and new species. *Mineral. Mag.*, 76(5), 1175-1207.