

**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  $120^\circ$  about [102].

**Physical Properties:** *Cleavage:* Perfect on {001}. *Fracture:* Irregular. *Tenacity:* Slightly flexible; not elastic. Hardness =  $\sim 2.5$  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)

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

(1) Lomas Bayas mine, Antofagasta Province, Chile; normalized electron microprobe analysis, H<sub>2</sub>O 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.