Chinchorroite $Na_2Mg_5(As_2O_7)_2[AsO_3(OH)]_2(H_2O)_{10}$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As isolated tablets to ~1 mm flattened on {001} and elongate along [100] that exhibit {100}, {010}, {001} and {1$\bar{1}$ 0}; in massive intergrowths.

Physical Properties: *Cleavage*: Very good on {100} and {010}. *Tenacity*: Brittle. Hardness = 2.5 *Fracture*: Curved, stepped. D(meas.) = 2.75(2) D(calc.) = 2.758 Easily soluble in dilute HCl.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (+). α = 1.546(2) β = 1.560(2) γ = 1.578(2) 2V(meas.) = 84(2)° 2V(calc.) = 83.7° *Orientation*: $X \wedge a = 4°$, $Y \wedge b = 52°$, $Z \wedge c = 20°$. *Dispersion*: Inclined, distinct, $r > v$. Nonpleochroic.

Cell Data: *Space Group*: $P\bar{1}$. a = 8.7777(2) b = 8.8570(3) c = 9.7981(7) α = 91.097(6)° β = 110.544(8)° γ = 103.167(7)° Z = 1

X-Ray Diffraction Pattern: Torrecillas mine, Iquique Province, Tarapacá Region, Chile. 9.10 (100), 8.63 (54), 3.036 (53), 4.034 (49), 2.811 (42), 2.568 (36), 3.521 (35)

Chemistry:

	(1)
Na_2O	5.03
CaO	0.06
MgO	17.39
As_2O_5	60.33
H_2O	[17.54]
Total	100.35

(1) Torrecillas mine, Iquique Province, Tarapacá Region, Chile; average electron microprobe analysis supplemented by Raman spectroscopy, H_2O calculated from structure; corresponds to $(Na_{1.86}Ca_{0.01})_{\Sigma=1.87}Mg_{4.93}[As_2O_7]_2[AsO_{2.87}(OH)_{1.13}]_2(H_2O)_{10}$.

Occurance: A low-temperature secondary phase on massive quartz-hematite veins and formed under hyperarid conditions from the oxidation of native arsenic, and possibly other As-bearing primary phases by reaction with fluids (derived from fog) rich in dissolved Na, Ca, and Mg.

Association: Anhydrite, gypsum, halite, talmessite.

Distribution: From the Torrecillas mine, northern Atacama Desert, Salar Grande, Iquique Province, Tarapacá Region, Chile.

Name: For the *Chinchorro* culture of the inhabitants of the coastal region of northern Chile and southern Peru from 9000 to 3500 years BP that includes the area around Torrecillas. These people suffered extensively from poisoning due to their consumption of water contaminated with arsenic.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (67257).

References: (1) Kampf, A.R., B.P. Nash, A.J. Celestian, M. Dini, and A.A. Molina Donoso (2019) Camanchacaite, chinchorroite, espadaite, magnesiofluckite, picaite and ríosecoite: six new hydrogen-arsenate minerals from the Torrecillas mine, Iquique Province, Chile. Mineral. Mag., 83, 655-671.