Camanchacaite $Na\square CaMg_2(AsO_4)_2[AsO_2(OH)_2]$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As balls with compact radial structure to ~1 mm in diameter.

Physical Properties: *Cleavage*: Perfect on {101} and {010} by analogy with other alluaudite-group minerals. *Tenacity*: Brittle. *Fracture*: Splintery. Hardness = 2.5 D(meas.) = n.d. D(calc.) = 3.568 Soluble in dilute HCl.

Optical Properties: Transparent to translucent. *Color*: Colorless, pink-beige. *Streak*: White. *Luster*: Vitreous.
Optical Class: Biaxial (+). α = 1.647(2) β = 1.656(2) γ = 1.685(2) 2V(meas.) = 60(10)° 2V(calc.) = 59.1° *Orientation*: *Z* = *b*. *Dispersion*: Slight, *r* < *v*. Nonpleochroic.

Cell Data: *Space Group*: *C*2/*c*. *a* = 12.470(9) *b* = 12.554(9) *c* = 6.848(9) β = 113.75(2)° Z = 4

X-Ray Diffraction Pattern: Torrecillas mine, Iquique Province, Tarapacá Region, Chile. 2.735 (100), 2.806 (96), 3.263 (93), 4.134 (66), 3.115 (60), 1.6892 (49), 6.27 (40)

Chemistry:

	(1)
Na_2O	5.78
CaO	8.87
MgO	16.06
MnO	0.24
As_2O_5	65.22
H_2O	[3.57]
Total	99.74

(1) Torrecillas mine, Iquique Province, Tarapacá Region, Chile; average electron microprobe analysis supplemented by Raman spectroscopy, H_2O calculated from structure; corresponds to $(Na_{0.99}Ca_{0.84}Mg_{2.11}Mn_{0.02})_{\Sigma=3.96}[AsO_4][AsO_{2.95}(OH)_{1.05}]_2$.

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: Magnesiofluckite, picaite, ríosecoite, chinchorroite, currierite, anhydrite, gypsum, halite, talmessite.

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

Name: For the 'camanchaca', a dense fog that forms along the northern Chilean coast where the Atacama Desert reaches the Pacific Ocean. The moisture particles of the fog are between 1 and 40 μm in diameter - too small to form raindrops.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (67257, 66771, 66772, 66773, and 66774).

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.