Ríosecoite $Ca_2Mg(AsO_3OH)_3(H_2O)_2$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As prisms to ~1 mm, elongated and striated along [100] with irregular terminations that commonly come to a somewhat rounded point. Only the prism forms {010} and {001} were observed. Often intergrown in subparallel bundles.

Physical Properties: *Cleavage*: Perfect on {001} and {010}. *Tenacity*: Brittle. Hardness = 3.5 *Fracture*: Stepped. D(meas.) = 3.24(2) D(calc.) = 3.243 Easily soluble in dilute HCl.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (-). $\alpha = 1.637(1)$ $\beta = 1.651(1)$ $\gamma = 1.664(1)$ 2V(meas.) = 88(1)° 2V(calc.) = 87.2° *Orientation*: $X \wedge b \approx 18°$, $Y \wedge a \approx 10°$, $Z \wedge c \approx 48°$. *Dispersion*: Distinct, $r < v$. Nonpleochroic.

Cell Data: *Space Group*: $P\bar{1}$. $a = 6.8110(9)$ $b = 7.3156(12)$ $c = 11.7773(17)$ $\alpha = 83.466(6)°$ $\beta = 84.394(6)°$ $\gamma = 79.779(6)°$ Z = 2

X-Ray Diffraction Pattern: Torrecillas mine, Iquique Province, Tarapacá Region, Chile. 3.578 (100), 2.784 (71), 3.006 (68), 3.142 (43), 3.361 (41), 7.18 (36), 4.239 (35)

Chemistry:

	(1)
Na_2O	0.07
CaO	19.74
MgO	6.95
As_2O_5	61.59
H_2O	[11.45]
Total	99.80

(1) Torrecillas mine, Iquique Province, Tarapacá Region, Chile; average electron microprobe analysis supplemented by Raman spectroscopy, H_2O calculated from structure; corresponds to $(Ca_{1.97}Mg_{0.97}Na_{0.01})_{\Sigma=2.95}[AsO_{2.96}(OH)_{1.04}]_3(H_2O)_2$.

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: Camanchacaite, anhydrite, gypsum, halite, talmessite.

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

Name: For Caleta Río Seco (Río Seco Cove), at the SW base of Torrecillas Hill, and for the small town of Río Seco, which is ~2.5 km southwest of the Torrecillas mine. 'Río seco' means dry river in Spanish and, in this case, refers to the river that formed Quebrada de Pica, which reaches the Pacific Ocean at Caleta Rio Seco.

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.