Antofagastaite $Na_2Ca(SO_4)_2 \cdot 1.5H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As prismatic, lath-like, or acicular crystals to 5 mm, elongated along [010], typically in open-work aggregates to 1 cm.

Physical Properties: *Cleavage*: Distinct on (001) and a second direction visible in thin section. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = ~3 D(meas.) = 2.42(1) D(calc.) = 2.465 Nonfluorescent.

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (-). α = 1.489(2) β = 1.508(2) γ = 1.510(2) 2V(meas.) = 40(10)° 2V(calc.) = 36° *Dispersion*: Strong, $r > v$. *Orientation*: $Z = a$.

Cell Data: *Space Group: P*$2_1/m$. a = 6.4596(4) b = 6.8703(5) c = 9.4685(7) β = 104.580(4)° Z = 2

X-Ray Diffraction Pattern: Coronel Manuel Rodríguez mine, Antofagasta region, Chile. 9.17 (100), 3.437 (59), 5.501 (57), 2.918 (50), 2.753 (50), 3.058 (43), 2.795 (35)

Chemistry:

	(1)	(2)
Na_2O	20.85	20.31
CaO	17.42	18.37
SO_3	52.56	52.46
H_2O	7.93	8.86
Total	98.76	100.00

(1) Coronel Manuel Rodríguez mine, Antofagasta region, Chile; average electron microprobe and IR spectroscopic analyses, H_2O by gas chromatography; corresponds to $Na_{2.06}Ca_{0.95}S_{2.01}O_8 \cdot 1.35H_2O$. (2) $Na_2Ca(SO_4)_2 \cdot 1.5H_2O$.

Occurrence: In the oxidation zone of sulfide-quartz veins weathered in an extremely arid climate. A sublimate at an active volcanic fumarole.

Association: Sideronatrite, metasideronatrite, aubertite, gypsum, ferrinatrite, glauberite, amarillite (Chile); syngenite, blödite (Russia).

Distribution: At the Coronel Manuel Rodríguez mine, Mejillones peninsula, Antofagasta province, Antofagasta region, Chile [TL]. In the Arsenatnaya fumarole, Tolbachik volcano, Kamchatka, Russia.

Name: For the *Antofagasta* Province, Chile in which the type locality occurs.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5222/1; 96263).

References: (1) Pekov, I.V., V.M. Kovrugin, O.I. Siidra, N.V. Chukanov, D.I. Belakovskiy, N.N. Koshlyakova, V.O. Yapaskurt, A.G. Turchkova, and G. Möhn (2019) Antofagastaite, $Na_2Ca(SO_4)_2 \cdot 1.5H_2O$, a new mineral related to syngenite. Mineral. Mag., 83, 781-790.