Caracolite $Na_3Pb_2(SO_4)_3Cl$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Typically as incrustations of prismatic crystals, to 3 mm. *Twinning:* Pseudohexagonal trillings are produced by twinning, which may be polysynthetic.

Physical Properties: Hardness = 4.5 D(meas.) = ∼5.1 D(calc.) = 4.50 Decomposes in H_2O, leaving $PbSO_4$.

Optical Properties: Transparent. *Color:* Colorless, pale gray, may be stained green.
Luster: Vitreous.
Optical Class: Biaxial (–). *Dispersion:* $r > v$, strong. $\alpha = 1.743(5)$ $\beta = 1.754(5)$ $\gamma = 1.764(5)$ 2V(meas.) = Very large.

Cell Data: *Space Group:* $P2_1/m$. $a = 19.62$ $b = 7.14$ $c = 9.81$ $\beta = 90°$ Z = 4

X-ray Powder Pattern: Beatriz mine, Chile. (ICDD 25-706).
2.927 (100), 1.906 (56), 3.55 (55), 2.876 (45), 2.132 (35), 8.45 (31), 4.03 (31)

Chemistry:

	(1)	(2)
SO_3	16.70	29.76
FeO	0.33	
ZnO	0.29	
PbO		55.32
Pb	50.88	
Cu	2.51	
Na_2O	trace	11.52
Cl	10.18	4.39
insol.	1.84	
$-O = Cl_2$		0.99
Total		100.00

(1) Beatriz mine, Chile; partial analysis of impure material; composition established by crystal-structure analysis of natural and synthetic material. (2) $Na_3Pb_2(SO_4)_3Cl$.

Occurrence: A rare secondary mineral in the oxidized zone of chlorine-rich lead deposits.

Association: Boleite, pseudoboleite, bindheimite, anglesite, galena (Beatriz mine, Chile); atacamite, boleite, osarizawaite–beaverite, paratacamite (Herminia mine, Chile).

Distribution: From the Beatriz, Herminia, Santa Ana, and San Rafael mines, Sierra Gorda district, southwest of Calama, Antofagasta, Chile. In the Auguste-Victoria mine, Marl-Hüls, Ruhr Valley, North Rhine-Westphalia, Germany.

Name: For Caracoles, a town near the Beatriz mine, Chile.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 546–547. (2) Schneider, W. (1969) Bestimmung einer Überstruktur am Caracolit. Neues Jahrb. Mineral., Monatsh., 58–64 (in German with English abs.).