

Crystal Data: Monoclinic. *Point Group:* 2/m. As very thin single laths, to 2 mm, straight, or commonly warped, with frayed ends; as felted masses and stellate groups. *Twinning:* Stellate trillings and as simple V-shapes.

Physical Properties: *Tenacity:* Somewhat malleable, slightly elastic, easily twisting and bending. Hardness = ~2 VHN = 132 (20 g load). D(meas.) = 6.7 D(calc.) = 6.95

Optical Properties: Opaque. *Color:* White to silvery gray, tarnishes iridescent.

Luster: Metallic. *Anisotropism:* Strong, from blue to gray.

R₁–R₂: (400) 49.2–51.3, (420) 49.8–52.4, (440) 50.4–53.5, (460) 50.7–53.7, (480) 50.6–53.3, (500) 50.2–52.8, (520) 49.7–52.2, (540) 49.2–51.6, (560) 48.6–51.0, (580) 48.2–50.4, (600) 47.8–50.0, (620) 47.5–49.5, (640) 47.3–49.2, (660) 47.2–49.0, (680) 47.2–49.0, (700) 47.2–49.2

Cell Data: *Space Group:* P2₁/m. a = 4.13 b = 4.09 c = 15.48 β = 98.56° Z = 1

X-ray Powder Pattern: Vulcano, Italy (shows some preferred orientation).

3.82 (10), 3.01 (6), 2.68 (6), 2.87 (5), 2.22 (5), 2.03 (5), 1.910 (4)

Chemistry:	(1)	(2)	(3)	(1)	(2)	(3)
Pb	36.21	37.51	38.30	Sb	0.02	
Ag		0.17		Te	0.21	
Fe		0.03		Se	4.56	
Bi	44.56	44.96	45.34	S	14.07	16.36
				Total	99.42	[99.13] 100.00

(1) Vulcano, Italy; by electron microprobe, average of eight analyses; corresponds to Pb_{44.70}(Bi_{54.54}Sb_{0.02})_{Σ=54.56}(S_{112.23}Se_{14.77})_{Σ=127.00}. (2) Mittal-Hohtenn tunnel, Switzerland; by electron microprobe, corresponding to (Pb_{45.22}Ag_{0.39})_{Σ=45.61}Bi_{53.74}(S_{126.59}Te_{0.41})_{Σ=127.00}. (3) Pb₄₆Bi₅₄S₁₂₇.

Occurrence: Associated with deep fumarolic activity (Vulcano, Italy); in sulfide veinlets in a greisen Sn–W deposit in granite (Shumilovsk deposit, Russia).

Association: Lillianite, mozgovaite, kirkiite, barberiite, galenobismutite, bismuthinite, galena, gold, tellurium (Vulcano, Italy); wolframite, cassiterite, bismuthinite, galena, cosalite, heyrovskýite, galenobismutite, bursaite, tetradymite, joséite-B, bismuth, quartz (Shumilovsk deposit, Russia).

Distribution: In Italy, on Vulcano, in the Lipari Islands [TL], and from the Ginevro mine, Elba. From Santa Maria, Val Medel, Graubünden, at Goppenstein, Lotschental, and in the Mittal-Hohtenn tunnel, Valais, Switzerland. From the Felbertal tungsten mine, Salzburg, Austria. In the Shumilovsk Sn–W deposit, west Transbaikal, and the Vysokogorsk deposit, Far Eastern Region, Russia. From the Hobenzan granitic complex, Yamaguchi Prefecture, Japan. At Landsman Camp, Graham Co., Arizona, USA.

Name: Honors Stanislao Cannizzaro (1826–1910), celebrated Italian chemist, University of Rome, Italy.

Type Material: University of Florence, Florence, Italy, 14398/G; Natural History Museum, 128.28; National School of Mines, Paris, France.

References: (1) Zambonini, F., O. de Fiore, and G. Carobbi (1925) Su un sulfobismuto di piombo di Vulcano. *Annali. R. Osserv. Vesuv.*, Ser. 3, 1, 31–36 (in Italian). (2) Graham, A.R., R.M. Thompson, and L.G. Berry (1953) Studies of mineral sulfo-salts; XVII – cannizzarite. *Amer. Mineral.*, 38, 536–544. (3) Matzat, E. (1979) Cannizzarite. *Acta Cryst.*, 35, 133–136. (4) Borodaev, Y.S., A. Garavelli, C. Garbarino, S.M. Grillo, N.N. Mozgova, N.I. Organova, and N.Y. Trubkin (2000) Rare sulfosalts from Vulcano, Aeolian Islands, Italy. III. Wittite and cannizzarite. *Can. Mineral.*, 38, 23–34. (5) Berlepsch, P., T. Armbruster, E. Makovicky, C. Hejny, D. Topa, and S. Graeser (2001) The crystal structure of (001) twinned xilingolite, Pb₃Bi₂S₆, from Mittal-Hohtenn, Valais, Switzerland. *Can. Mineral.*, 39, 1653–1663.

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