

Crystal Data: Monoclinic. *Point Group:* 2/m. As elongated crystals, to 0.5 mm.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 3.3–3.4 VHN = 197–216, 206 average (25 g load). D(meas.) = n.d. D(calc.) = 6.948

Optical Properties: Opaque. *Color:* Black; bright white in reflected light. *Streak:* Grayish black. *Luster:* Metallic.

Optical Class: Biaxial. *Pleochroism:* Slight; very pale gray to creamy white.

Anisotropism: Distinct; brown, pale brown, grayish brown. *Birefractance:* Perceptible.

R₁–R₂: (400) 42.6–45.8, (420) 42.8–45.8, (440) 43.0–46.2, (460) 42.8–46.2, (480) 42.5–45.9, (500) 42.0–45.4, (520) 41.4–44.9, (540) 40.8–44.3, (560) 40.2–43.8, (580) 39.6–43.3, (600) 39.3–43.1, (620) 39.1–43.0, (640) 39.0–43.0, (660) 38.9–43.2, (680) 38.9–43.1, (700) 39.0–43.2

Cell Data: *Space Group:* C2/m. *a* = 27.637(4) *b* = 4.0499(6) *c* = 20.741(3) *β* = 131.258(2)° *Z* = 2

X-ray Powder Pattern: Felbertal mine, Austria.

3.78 (s), 3.51 (s), 3.38 (s), 2.320 (s), 2.096 (s), 2.062 (s), 2.031 (s)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Ag	1.10	2.13		Se	0.00	1.38	
Pb	29.9	27.14	34.05	Sb		0.03	
Cu	3.56	3.94	3.48	Bi	48.3	49.67	45.78
Cd	0.43			S	16.8	16.59	16.69
Te	0.21	0.46		Total	[100.3]	101.34	100.00

(1) Felbertal mine, Austria; by electron microprobe, average of fifteen analyses, original total given as 100.36% or 100.4%; corresponds to Cu_{2.02}Ag_{0.37}(Pb_{5.20}Cd_{0.14})_{Σ=5.34}Bi_{8.33}(S_{18.88}Te_{0.06})_{Σ=18.94}. (2) Funiushan deposit, China; by electron microprobe, corresponds to Cu_{2.19}Ag_{0.70}Pb_{4.64}(Bi_{8.41}Sb_{0.01})_{Σ=8.42}(S_{18.31}Se_{0.62}Te_{0.13})_{Σ=19.06}. (3) Cu₂Pb₆Bi₈S₁₉.

Occurrence: In a hydrothermal tungsten deposit in amphibolites and felsic gneisses, in discordant quartz veins (Felbertal mine, Austria); in a copper deposit in skarn, developed at the contact between a granodiorite complex with quartz sandstone and slate hornfels (Funiushan deposit, China).

Association: Cosalite, lillianite, bismuthinite–aikinite species, cannizzarite, junosite, pavonite series species, bismuth, chalcopyrite (Felbertal mine, Austria); aikinite, friedrichite, berryite, wittichenite, pekoite, benjaminite, tetradymite, galena, chalcopyrite, andradite (Funiushan deposit, China).

Distribution: From the Felbertal tungsten mine, Salzburg, Austria [TL]. At the Funiushan copper skarn deposit, 26 km east of Nanjing, Jiangsu Province, China.

Name: For the valley of Felbertal, Austria, in which the mineral was found.

Type Material: University of Copenhagen, Copenhagen, Denmark; Mineralogical Institute, University of Salzburg, Salzburg, Austria, 14493, 14494; The Natural History Museum, London, England, 1999,174.

References: (1) Topa, D., E. Makovicky, A.J. Criddle, W.H. Paar, and T. Balič-Žunić (2001) Felbertalite, Cu₂Pb₆Bi₈S₁₉, a new mineral species from Felbertal, Salzburg Province, Austria. *Eur. J. Mineral.*, 13, 961–972. (2) (2002) *Amer. Mineral.*, 87, 765 (abs. ref. 1). (3) Topa, D., E. Makovicky, T. Balič-Žunić, and P. Berlepsch (2000) The crystal structure of Cu₂Pb₆Bi₈S₁₉. *Eur. J. Mineral.*, 12, 825–833. (4) Xiang-Ping, G., M. Watanabe, M. Ohkawa, L. Hoshino, and Y. Shibata (2001) Felbertalite and related bismuth sulfosalts from the Funiushan copper skarn deposit, Nanjing, China. *Can. Mineral.*, 39, 1641–1652.

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