Argentotetrahedrite-(Zn) $Ag_6(Cu_4Zn_2)Sb_4S_{13}$

Crystal Data: Cubic. *Point Group*: $\bar{4}\,3m$. As anhedral grains to 0.1 mm (Kremnica). Forms domains within a 1-mm tristetrahedral crystal of Ag-bearing tetrahedrite-(Zn) (Lengenbach).

Physical Properties: *Cleavage*: Indistinct. *Tenacity*: Brittle. *Fracture*: Conchoidal.
Hardness = 3.5-4 D(meas.) = n.d. D(calc.) = 5.089

Optical Properties: Opaque. *Color*: Steel gray, tarnishes black; gray with blue-gray tints in reflected light. *Streak*: Black. *Luster*: Metallic.
Optical Class: Isotropic.
R_1-R_2: (470) 30.1, (546) 29.8, (589) 29.8, (650) 28.3

Cell Data: *Space Group: I* $\bar{4}\,3m$. a = 10.550(1) Z = 2

X-Ray Diffraction Pattern: Calculated pattern.
3.046 (100), 1.865 (35), 7.460 (24), 2.638 (23), 1.591 (18), 2.820 (6), 2.487 (6)

Chemistry:

	(1)	(2)	(3)
Cu	23.97	23.99	13.13
Ag	19.78	18.90	33.43
Fe	0.73	0.50	
Zn	6.20	5.58	7.65
Cd	0.15	1.45	
Hg	0.06	0.13	
As	0.71	1.32	
Sb	26.33	24.97	25.16
S	22.85	22.61	21.53
Total	100.78	99.44	100.00

(1) Kremnica deposit, Banská Bystrica Region, Slovak Republic; average electron microprobe analysis; corresponds to $(Ag_{3.27}Cu_{2.69})_{\Sigma=5.96}[Cu_{4.00}(Zn_{1.69}Fe_{0.23}Cu_{0.05}Cd_{0.02}Hg_{0.01})_{\Sigma=2.00}]_{\Sigma=6.00}(Sb_{3.86}As_{0.17})_{\Sigma=4.03}S_{12.73}$. (2) Lengenbach quarry, Imfeld, Binn Valley, Canton of Valais, Switzerland; average electron microprobe analysis; corresponds to $(Ag_{3.17}Cu_{2.79})_{\Sigma=5.96}[Cu_{4.00}(Zn_{1.55}Cd_{0.23}Fe_{0.16}Cu_{0.05}Hg_{0.01})_{\Sigma=2.00}]_{\Sigma=6.00}(Sb_{3.71}As_{0.32})_{\Sigma=4.03}S_{12.77}$. (3) $Ag_6(Cu_4Zn_2)Sb_4S_{13}$.

Mineral Group: Tetrahedrite group, tetrahedrite series.

Occurrence: In a low-sulfidation, epithermal Au-Ag-Sb vein deposit (Kremnica). In hydrothermally altered metamorphosed dolostone (upper greenschist to lower amphibolite) (Lengenbach).

Association: Argentotennantite-(Fe), chalcopyrite, quartz (Kremnica); tetrahedrite-(Zn), dolomite (Lengenbach); kenoargentotetrahedrite-(Fe) (Zvěstov).

Distribution: From the Kremnica deposit, Žiar nad Hronom District, Banská Bystrica Region, Slovak Republic (type), the Lengenbach quarry, Imfeld, Binn Valley, Canton of Valais, Switzerland (cotype), and at Zvěstov (Stříbrnice), 10 km southwest of Vlašim, central Bohemia, Czech Republic.

Name: Suffix indicates a member of the *tetrahedrite* series (B = Cu, D = Sb, Y = S) with dominant zinc as the C constituent in the general structural formula ${}^{M(2)}A_6{}^{M(1)}(B_4C_2)^{X(3)}D_4{}^{S(1)}Y_{12}{}^{S(2)}Z$. The prefix, *argento*, indicates dominant silver in the *M*(2) site.

Type Material: Department of Mineralogy and Petrology, National Museum, Prague, Czech Republic (P1P 51/2020 Kremnica) and the Natural History Museum, University of Pisa, Italy (19922 Kremnica and 19923 Lengenbach).

References: (1) Sejkora J, C. Biagioni, M. Števko, T. Raber, P. Roth, and L. Vrtiška (2022) Argentotetrahedrite-(Zn), $Ag_6(Cu_4Zn_2)Sb_4S_{13}$, a new member of the tetrahedrite group. Mineral. Mag., 86, 319-330. (2) Biagion, C., L.L. George, N.J. Cook, E. Makovicky, Y. Moëlo, M. Pasero, J. Sejkora, C.J. Stanley, M.D. Welch, and F. Bosi (2020) The tetrahedrite group: nomenclature and classification. Amer. Mineral., 105, 109-122.