Quadratite $AgCdAsS_3$

Crystal Data: Tetragonal. *Point Group*: 422. Crystals, to 1 mm, have characteristic quadratic shape and are tabular on {001}, with {103}, {104}, {111}, and {116}. *Twinning*: Rarely as penetration twins along (016).

Physical Properties: *Cleavage*: Perfect on {001}, distinct on {110}. *Tenacity*: Ductile to flexible in thin laminae. *Fracture*: n.d. Hardness = 3 VHN = 63 (52-72) (10 g load). D(meas.) = n.d. D(calc.) = 5.31

Optical Properties: Translucent on thin edges to opague. *Color*: Reddish to gray; grayish white with a bluish tint and dark red internal reflection along cleavage cracks in reflected light. *Streak*: Reddish brown. *Luster*: Metallic in thick laminae.
Optical Class: n.d.
R_1-R_2: (470) 30.5-32.3, (543) 29.6-30.8, (587) 28.7-29.7, (657) 26.3-28.0

Cell Data: Space Group: $P4_322$. $a = 5.5229(4)$ $c = 33.399(5)$ $Z = 8$

X-ray Powder Pattern: Lengenbach, Binntal, Switzerland.
2.77 (100), 1.960 (80), 1.679 (70), 1.598 (70), 1.274 (60), 3.19 (50), 1.664 (40)

Chemistry:

	(1)
Tl	0.23
Ag	26.30
Cu	0.10
Pb	11.72
Cd	20.35
Zn	0.04
Fe	0.06
Mn	0.03
Sb	0.05
As	17.55
Cr	0.01
S	24.04
Total	100.48

(1) Lengenbach, Binntal, Switzerland; average of 5 electron microprobe analyses; corresponds to $(Ag_{0.994}Cd_{0.738}Pb_{0.231}Cu_{0.006}Tl_{0.005}Mn_{0.003}Fe_{0.004}Zn_{0.002}Cr_{0.001})_{\Sigma=1.984}(As_{0.955}Sb_{0.003})_{\Sigma=0.958}S_{3.058}$.

Occurrence: In cavities in hydrothermally altered dolostone, likely formed at a late stage.

Association: Galena, jordanite, pyrite, sphalerite, lengenbachite, hatchite.

Distribution: From Lengenbach, Binntal, Switzerland.

Name: Alludes to the characteristic crystal habit.

Type Material: Natural History Museum in Basel, and at the Mineralogical Institute, University of Basel, Switzerland.

References: (1) Graeser, S., W. Lustenhouwer, and P. Berlepsch (1998) Quadratite $Ag(Cd,Pb)(As,Sb)S_3$ - A new sulfide mineral from Lengenbach, Binntal (Switzerland). Schweiz. Mineral. Petrogr. Mitt, 78, 489-494. (2) (2000) Amer. Mineral., 85, 264 (abs. ref. 1). (3) Bindi, L., P.G. Spry, P. Bonazzi, E. Makovicky, and T. Balić-Žunić (2013) Quadratite, $AgCdAsS_3$: Chemical composition, crystal structure, and OD character. Amer. Mineral., 98, 242-247.