

Crystal Data: Orthorhombic. *Point Group:* *mm*2. As isolated columnar crystals, to 1.5 mm, or as granular aggregates.

Physical Properties: Hardness = n.d. VHN = 224 (50 g load). D(meas.) = 6.98
D(calc.) = 7.06

Optical Properties: Opaque. *Color:* In polished section, creamy yellowish white in air, more pinkish in oil. *Luster:* Metallic. *Anisotropism:* Strong in oil, distinct in air.
R₁–R₂: (470) 41.0–46.7, (546) 40.1–46.2, (589) 39.9–45.8, (650) 39.9–45.6

Cell Data: *Space Group:* *Pb*2₁*m*. *a* = 33.84(6) *b* = 11.65(07) *c* = 4.010(3) *Z* = 2

X-ray Powder Pattern: Salzburg, Austria.
3.644 (100), 3.584 (100), 3.161 (100), 2.850 (80), 4.05 (40), 2.577 (40), 1.979 (40)

Chemistry:	(1)	(2)	(3)
Pb	29.7	28.0	30.53
Cu	9.1	10.2	9.36
Bi	44.2	44.7	43.10
S	17.2	17.2	17.01
Total	100.2	100.1	100.00

(1) Salzburg, Austria; by electron microprobe, average of six analyses; corresponding to Pb_{4.81}Cu_{4.80}Bi_{7.10}S_{18.00}. (2) Do.; by electron microprobe, average of 12 analyses; corresponding to Pb_{4.54}Cu_{5.39}Bi_{7.17}S_{18.00}. (3) Pb₅Cu₅Bi₇S₁₈.

Occurrence: As aggregates of granular crystals, in boulders of vein quartz which occur in the scree of a landslide (Salzburg, Austria); in magnesian and calcic skarn deposits (Apuseni Mountains, Romania).

Association: Chalcopyrite, covellite, cerussite, chlorite, mica, quartz (Salzburg, Austria); cuprobismutite, cupropavonite (Apuseni Mountains, Romania).

Distribution: Near the emerald beryl deposit in the “Sedl” region, east of the Habachtal, Salzburg, Austria [TL]. In Romania, from the Antoniu, Blidar, and Secundar deposits, Apuseni Mountains, Băița (Rézbánya), and in the Baia Borsă area, Baia Mare (Nagybánya). From Les Houches, Haute-Savoie, France. At the Paliopyrgos area, northern Greece. In the USA, from the Fremont mine, Apache Hills, east of Hachita, Grant Co., New Mexico; near Panguitch, Garfield Co., Utah; on the northeast flank of the Johnny Lyon Hills, Cochise Co., Arizona; and at the Silver Bismuth claim, near the Outlaw mine, Round Mountain district, Nye Co., Nevada. In the Julcani district, Peru. From the Shin-Ohtoyo deposit, Harukayama district, Hokkaido, Japan. In the Funiushan copper skarn deposit, near Nanjing, Jiangsu Province, China. At Inkur, Transbaikal, Russia.

Name: To honor Professor Dr.-Ing Otmar Michael Friedrich (1902–1991), Austrian geologist of the Mining University, Leoben, Styria, Austria.

Type Material: Institute of Mineralogy, University of Salzburg, Salzburg, Austria; Joanneum Provincial Museum, Graz, Styria, Austria; Canadian Geological Survey, Ottawa; Royal Ontario Museum, Toronto, Canada; The Natural History Museum, London, England, 1982,574; Harvard University, Cambridge, Massachusetts, 117007; National Museum of Natural History, Washington, D.C., USA, 144072, 144185.

References: (1) Chen, T.T., E. Kirchner, and W. Paar (1978) Friedrichite, Cu₅Pb₅Bi₇S₁₈, a new member of the aikinite–bismuthinite series. *Can. Mineral.*, 16, 127–130. (2) (1979) *Amer. Mineral.*, 64, 654 (abs. ref. 1). (3) Pring, A. (1989) Structural disorder in aikinite and krupkaite. *Amer. Mineral.*, 74, 250–255. (4) Topa, D., E. Makovicky, and W.H. Paar (2002) Composition ranges and exolution pairs for the members of the bismuthinite–aikinite series from Felbertal, Austria. *Can. Mineral.*, 40, 849–869.

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