

**Crystal Data:** Monoclinic, pseudo-orthorhombic. *Point Group:*  $2/m$ . Crystals, to 30 cm, flat tabular to blocky to prismatic, striated  $\parallel$  [001]. Also compact, granular, columnar. *Twinning:* Common on {100} and {001}; as contact or penetration twins on {101}; on {012} to produce star-shaped trillings or cruciform twins.

**Physical Properties:** *Cleavage:* Distinct on {101}; {010} in traces. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = 5.5–6 VHN = 1081 on (001) section (100 g load). D(meas.) = 6.07(15) D(calc.) = 6.18

**Optical Properties:** Opaque. *Color:* Silver-white to steel-gray; in polished section, white with faint yellow tint. *Luster:* Metallic. *Pleochroism:* Weak, in white or bluish tint and faint reddish yellow. *Anisotropism:* Strong, red-violet.  $R_1$ – $R_2$ : (400) 50.3–51.8, (420) 50.3–51.8, (440) 51.3–51.8, (460) 50.6–51.8, (480) 51.0–51.9, (500) 51.4–51.9, (520) 51.8–51.9, (540) 52.2–51.9, (560) 52.5–51.9, (580) 53.0–51.8, (600) 53.4–51.6, (620) 53.6–51.5, (640) 53.6–51.3, (660) 53.6–51.3, (680) 53.4–51.2, (700) 53.2–51.0

**Cell Data:** *Space Group:*  $P2_1/c$ .  $a = 5.744(2)$   $b = 5.675(1)$   $c = 5.785(2)$   
 $\beta = 112.17(2)^\circ$   $Z = 4$

**X-ray Powder Pattern:** Freiberg, Germany.  
2.677 (100), 2.662 (100), 2.418 (95), 2.412 (95), 2.440 (90), 1.814 (90), 1.824 (70)

| Chemistry: | (1)   | (2)    | (3)    |
|------------|-------|--------|--------|
| Fe         | 34.53 | 32.48  | 34.30  |
| Co         | 0.09  | 1.16   |        |
| Bi         | 0.79  |        |        |
| As         | 44.34 | 48.72  | 46.01  |
| S          | 20.22 | 18.80  | 19.69  |
| Total      | 99.97 | 101.16 | 100.00 |

(1) O'Brien mine, Cobalt, Canada. (2) Franklin, New Jersey, USA. (3) FeAsS.

**Mineral Group:** Arsenopyrite group.

**Occurrence:** Of hydrothermal origin, typically one of the earliest minerals to form. Found in pegmatites, high-temperature gold-quartz and tin veins, and in contact metamorphic sulfide deposits; less commonly of low-temperature hydrothermal origin. Also in gneisses, schists and other metamorphic rocks.

**Association:** Pyrrhotite, pyrite, chalcopyrite, galena, gold, scheelite, cassiterite, many other species.

**Distribution:** The most abundant and widespread arsenic mineral; only a few localities for large and fine crystals can be mentioned. In Germany, from Altenberg, Ehrenfriedersdorf, and Freiberg, Saxony. In the Stari Trg mine, Trepča, Serbia. From Panasqueira, Portugal. At Sala, Tunaberg, Stollberg, Boliden, and Nordmark, Sweden. From Stratonik, Greece. In England, from a number of mines in Cornwall, and in Devonshire, at Tavistock. In the USA, from Franconia, Grafton Co., New Hampshire and Franklin, Sussex Co., New Jersey. From Hidalgo del Parral and Santa Eulalia, Chihuahua, Mexico. In Canada, in the Cobalt district, Ontario. In Japan, large crystals in the Obira mine, Bungo, Oita Prefecture; the Ashio mine, Tochigi Prefecture; and many other localities.

**Name:** A contraction of *arsenical pyrites*.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 316–322. (2) Fuess, H., T. Kratz, J. Töpel-Schadt, and G. Mieke (1987) Crystal structure refinement and electron microscopy of arsenopyrite. *Zeits. Krist.*, 179, 335–346. (3) Morimoto, N. and L.A. Clark (1961) Arsenopyrite crystal-chemical relations. *Amer. Mineral.*, 46, 1448–1469. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 23.

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