

**Annabergite****Ni<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub>•8H<sub>2</sub>O**

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**Crystal Data:** Monoclinic. *Point Group:* 2/m. Rare crystals, typically poorly formed, elongated along [001], flattened on [010], with {001}, {010}, {100}, several modifying forms, to 5 mm; usually as fibrous veinlets, crystalline crusts, or earthy.

**Physical Properties:** *Cleavage:* {010}, perfect; {100}, {102}, indistinct. *Tenacity:* Sectile; thin {010} laminae flexible. *Hardness* = 1.5–2.5 *D*(meas.) = 3.07 *D*(calc.) = 3.146

**Optical Properties:** Transparent to translucent. *Color:* Apple-green, pale green, pale rose or pale pink, white, gray; may be zoned. *Streak:* Pale green to white. *Luster:* Subadamantine, pearly on cleavages, may be dull, earthy.

*Optical Class:* Biaxial (+), may be biaxial (-). *Orientation:* X = b; Z ∩ c = 36°.

*Dispersion:* r > v. α = 1.622 β = 1.658 γ = 1.687 2V(meas.) = 84°

**Cell Data:** *Space Group:* C2/m. a = 10.179(2) b = 13.309(3) c = 4.725(1)  
β = 105.00(1)° Z = 2

**X-ray Powder Pattern:** Locality unknown. (ICDD 11-625).  
6.58 (100), 2.98 (30), 3.18 (26), 7.82 (25), 4.33 (20), 2.71 (18), 2.67 (14)

<b>Chemistry:</b>	(1)	(2)	(1)	(2)	
As <sub>2</sub> O <sub>5</sub>	37.25	38.43	NiO	33.82	37.47
SiO <sub>2</sub>	0.41		MgO	0.21	
FeO	0.56		H <sub>2</sub> O	24.83	24.10
CoO	3.40		<hr/>		
			Total	100.48	100.00

(1) Cobalt, Canada. (2) Ni<sub>3</sub>(AsO<sub>4</sub>)<sub>2</sub>•8H<sub>2</sub>O.

**Polymorphism & Series:** Forms a series with erythrite.

**Mineral Group:** Vivianite group.

**Occurrence:** An uncommon secondary mineral, formed by the alteration of Co–Ni-bearing arsenides and sulfides, in the oxidized zone of hydrothermal mineral deposits.

**Association:** Erythrite, retgersite, gersdorffite, nickeline, maucherite, nickel-skutterudite.

**Distribution:** Many localities, but typically in small amounts. In Germany, from Annaberg and Schneeberg, Saxony; at Richelsdorf, Hesse. From Dobšiná (Dobschau), Slovakia. At Leogang, Salzburg, Austria. In the Sierra Cabrera, Almería Province, and at Molvizar, Granada Province, Spain. In England, in the Dolcoath mine, Cornwall; from the Coniston mines, Coniston, Cumbria. At Strathclyde and Galloway, Leadhills-Wanlockhead district, Scotland. Fine examples from the Kamariza, Plaka, and Verzekos mines, and along the road to Laurium, Greece. From the Bou Azzer district, Morocco. In the Tchah Shurch, and at the Talmessi mine, Anarak district, Iran. At the La Sorpresa mine, Tapacari, Cochabamba, Bolivia. In the Gloria mine, Alisito, Sinaloa, Mexico. In the USA, at the Ore Hill mine, Pacoima Canyon, Los Angeles Co., and in the Kalkar quarry, Santa Cruz, Santa Cruz Co., California; from the Nickel and Lovelock mines, Table Mountain district, Churchill Co., Nevada; at the Snowbird mine, Mineral Co., Montana; and in the Alhambra mine, Grant Co., New Mexico. At Cobalt, Ontario, Canada. In the 132 North deposit, Widgiemooltha district, Western Australia, and at several localities in the Flinders Ranges, South Australia. From the Horai mine, Hyogo Prefecture, and at Kuchisaka, Osaka Prefecture, Japan.

**Name:** For its originally noted occurrence at Annaberg, Germany.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 746–750. (2) Jambor, J.L. and J.E. Dutrizac (1995) Solid solutions in the annabergite – erythrite – hörnesite synthetic system. *Can. Mineral.*, 33, 1063–1071. (3) Wildner, M., G. Giester, C.L. Lengauer, and C.A. McCammon (1996) Structure and crystal chemistry of vivianite-type compounds: crystal structures of erythrite and annabergite with a Mössbauer study of erythrite. *Eur. J. Mineral.*, 8, 187–192.

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