

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Commonly in granular aggregates, reniform masses with radial structure, and reticulated and arborescent growths. Rarely as distorted, horizontally striated, $\{10\bar{1}1\}$ terminated crystals, to 1.5 cm. *Twining:* On $\{10\bar{1}1\}$ producing fourlings; possibly on $\{31\bar{4}1\}$.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 5–5.5 VHN = n.d. D(meas.) = 7.784 D(calc.) = 7.834

Optical Properties: Opaque. *Color:* Pale copper-red, tarnishes gray to blackish; white with strong yellowish pink hue in reflected light. *Streak:* Pale brownish black. *Luster:* Metallic. *Pleochroism:* Strong; whitish, yellow-pink to pale brownish pink. *Anisotropism:* Very strong, pale greenish yellow to slate-gray in air.

R_1 – R_2 : (400) 39.2–45.4, (420) 38.0–44.2, (440) 36.8–43.5, (460) 36.2–43.2, (480) 37.2–44.3, (500) 39.6–46.4, (520) 42.3–48.6, (540) 45.3–50.7, (560) 48.2–52.8, (580) 51.0–54.8, (600) 53.7–56.7, (620) 55.9–58.4, (640) 57.8–59.9, (660) 59.4–61.3, (680) 61.0–62.5, (700) 62.2–63.6

Cell Data: *Space Group:* $P6_3/mmc$. $a = 3.621(1)$ $c = 5.042(1)$ $Z = 2$

X-ray Powder Pattern: Unknown locality.

2.66 (100), 1.961 (90), 1.811 (80), 1.071 (40), 1.328 (30), 1.033 (30), 0.821 (30)

Chemistry:

	(1)	(2)
Ni	43.2	43.93
Co	0.4	
Fe	0.2	
As	55.9	56.07
Sb	0.1	
S	0.1	
Total	99.9	100.00

(1) Jáchymov, Czech Republic; by electron microprobe, corresponds to $(\text{Ni}_{0.98}\text{Co}_{0.01}\text{Fe}_{0.01})_{\Sigma=1.00}\text{As}_{1.00}$. (2) NiAs.

Mineral Group: Nickeline group.

Occurrence: A minor component of Ni–Cu ores in high-temperature hydrothermal veins; massive and in disseminations in peridotite and norite.

Association: Skutterudite–nickel-skutterudite, safflorite, rammelsbergite, gersdorffite, maucherite, breithauptite, michenerite, bismuth, bismuthinite.

Distribution: In Germany, from Eisleben and Mansfeld, Saxony-Anhalt; at St. Andreasberg, Harz Mountains; from Schneeberg, Saxony; crystallized at Richelsdorf, Hesse-Nassau. From Schladming, Austria. At Jáchymov (Joachimsthal), Czech Republic. From the Chalanches mine, near Allemont, Isère, France. In the USA, at Silver Cliff, Custer Co., and in the Gem mine, Fremont Co., Colorado. In Ontario, Canada, from the Cobalt–Gowganda and Sudbury districts, and at Silver Islet, Thunder Bay district. At Cochabamba, Bolivia. From the Ait Ahmane mine, 10 km east of Bou Azzer, Morocco. In the Talmessi mine, 35 km west of Anarak, Iran. At the Ban Phuc Ni–Cu deposit, northwestern Vietnam. Many additional occurrences have been noted.

Name: From the German *kupfernichel*, or *Devil's copper*, as the mineral was believed to contain copper but yielded none.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 236–238. (2) Faber, ?? (1933) ??title??Zeits. Krist., 84, 408 str??. (3) Beran, A. and T. Mohsenzadeh (1982) A reflected light investigation of nickeline, breithauptite and millerite. Tschermarks Mineral. Petrog. Mitt., 30, 267–275. (4) Berry, L.G. and R.M. Thompson (1962) X-ray powder data for the ore minerals. Geol. Soc. Amer. Mem. 85, 62.

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