

Crystal Data: Tetragonal. *Point Group:* $\bar{4}$. As isometric grains, to 30 μm , in kamacite lamellae and as xenomorphous elongate inclusions, to 200 μm , in kamacite spindles.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. VHN = 841-905, 874 average (25 g load). Hardness = n.d. D(meas.) = n.d. D(calc.) = 7.61

Optical Properties: Opaque. *Color:* In reflected light, white with a pink-yellow tint. *Luster:* Metallic.

Optical Class: Biaxial (+). No anisotropy observed in air, but weakly anisotropic in yellowish pinkish colors in oil ($n = 1.515$). No birefractance.

R₁-R₂: (480) 44.6-43.0, (560) 48.3-46.8, (580) 49.1-47.6, (660) 52.5-51.3

Cell Data: *Space Group:* $I\bar{4}$. $a = 8.9546(1)(1)$ $c = 4.38714(8)$ $Z = 8$

X-ray Powder Pattern: Synthetic.

2.17 (100), 1.995 (70), 2.13 (50), 2.08 (50), 2.48 (20), 2.01 (20)

Chemistry:	(1)	(2)
Fe	33.4	35.3
Ni	52.9	49.6
Co	0.0	0.2
<u>P</u>	<u>14.6</u>	<u>15.3</u>
Total	100.9	100.6

(1) Butler meteorite; electron microprobe analysis; corresponding to (Ni_{1.83}Fe_{1.21}) $\Sigma=3.04$ P_{0.96}.

(2) Do.; electron microprobe analysis; corresponding to (Ni_{1.71}Fe_{1.28}Co_{0.01}) $\Sigma=3.00$ P_{1.00}.

Polymorphism & Series: Solid solution series with Fe₃P.

Occurrence: In meteorites.

Association: Kamacite, taenite, carlsbergite, schreibersite, barringerite (Butler); allabogdanite (Onello).

Distribution: In iron meteorites: Butler [TL], Cañon Diablo, Carlton, Edmonton (Kentucky), Kenton County, Lenarto, Monahans, Oktibbeha County; also, in the Efremovka carbonaceous chondrite, the Onello ataxite, and the Vicenice octahedrite.

Name: Alludes to the composition.

Type Material: Mining Museum, Saint Petersburg Mining Institute, Russia.

References: (1) Britvin, S.N., V.D. Kolomensky, M.M. Boldyreva, A.N. Bogdanova, Yu.L. Kretser, O.N. Boldyreva, and N.S. Rudashevskii (1999) Nickelphosphide, (Ni,Fe)₃P, the nickel analog of schreibersite. *Zapiski Vsesoyuznogo Mineralogicheskogo Obshchestva*, 128, 64-72 (in Russian).

(2) (2000) *Amer. Mineral.*, 85, 875 (abs. ref. 1). (3) Skála, R. and M. Drábek (2003)

Nickelphosphide from the Vicenice octahedrite: Rietveld crystal structure refinement of a synthetic analogue. *Mineral. Mag.*, 67, 783-792.