

Crystal Data: Cubic. *Point Group:* 23. As grains, to 0.1 mm, in close intergrowth with other sulfides.

Physical Properties: Hardness = 5.5 VHN = 624–633; 645–760, 719 average.
D(meas.) = n.d. D(calc.) = [7.08–7.12]

Optical Properties: Opaque. *Color:* Pale gray, paler than associated nickel-skutterudite; in polished section, bright white with a rose tint. *Luster:* Metallic.

R: (400) —, (420) —, (440) 66.2, (460) 65.4, (480) —, (500) 64.0, (520) —, (540) 64.7, (560) —, (580) 65.7, (600) —, (620) 66.7, (640) —, (660) 66.8, (680) —, (700) 66.8

Cell Data: *Space Group:* $P2_13$. $a = 5.786\text{--}5.794$ $Z = 4$

X-ray Powder Pattern: Jáchymov, Czech Republic.

2.593 (10), 2.365 (8), 1.746 (8), 2.897 (6), 1.548 (6), 1.0242 (6), 2.051 (5)

Chemistry:	(1)	(2)	(3)	(4)
Ni	24.98	26.74	25.04	28.15
Co	0.22	0.30	1.65	
Fe	0.15	0.21	0.26	
Cu	0.86	0.85		
As	73.37	71.94	72.37	71.85
Sb			0.08	
S	0.19	0.15	0.02	
Total	99.65	100.19	99.42	100.00

(1) Jáchymov, Czech Republic; by electron microprobe, average of 32 analyses; corresponds to $(\text{Ni}_{0.87}\text{Cu}_{0.03}\text{Co}_{0.01})_{\Sigma=0.91}\text{As}_{2.00}$. (2) Do.; by electron microprobe, average of 31 analyses; corresponds to $(\text{Ni}_{0.94}\text{Cu}_{0.03}\text{Co}_{0.01}\text{Fe}_{0.01})_{\Sigma=0.99}(\text{As}_{1.99}\text{Sb}_{0.01})_{\Sigma=1.00}$. (3) Khovu-Aksy deposit, Russia; by electron microprobe, average of 10 analyses; corresponds to $(\text{Ni}_{0.88}\text{Co}_{0.03}\text{Fe}_{0.01})_{\Sigma=0.92}\text{As}_{2.00}$. (4) NiAs₂.

Polymorphism & Series: Trimorphous with rammelsbergite and parammelsbergite.

Occurrence: In Co–Ni–As sulfide veins of hydrothermal origin.

Association: Nickel-skutterudite, tennantite (Jáchymov, Czech Republic); nickeline, breithauptite, löllingite, nickel-skutterudite, rammelsbergite, parammelsbergite, silver (Khovu-Aksy deposit, Russia).

Distribution: From the Geshiber vein, Jáchymov (Joachimsthal), Czech Republic [TL]. At the Khovu-Aksy Ni–Co deposit, Tuva, Siberia, Russia.

Name: For Georgi Alekseevich Krutov (1902–1989), Professor of Mineralogy, Moscow State University, Moscow, Russia.

Type Material: National Museum, Prague, Czech Republic, 61625; Mining Institute, St. Petersburg; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Vinogradova, R.A., N.S. Rudashevskii, I.A. Bud'ko, L.I. Bochek, P. Kaspar, and K. Padera (1976) Krutovite – a new cubic nickel diarsenide. *Zap. Vses. Mineral. Obshch.*, 105, 59–71 (in Russian). (2) (1977) *Amer. Mineral.*, 62, 173–174 (abs. ref. 1). (3) Vinogradova, R.A., N.S. Rudashevskii, L.I. Bochek, and I.A. Bud'ko (1976) First discovery of krutovite in the USSR. *Doklady Acad. Nauk SSSR*, 230, 938–941 (in Russian).