Mertieite-II $Pd_8(Sb,As)_3$

Crystal Data: Hexagonal. *Point Group:* n.d. Anhedral grains, to about 0.5 mm.

Physical Properties: Hardness = n.d. VHN = 561–593, 578 average (50 g load). D(meas.) = n.d. D(calc.) = 11.2 for Sb:As = 5:1.

Optical Properties: Opaque. *Color:* In polished section, brassy yellow. *Luster:* Metallic. *Anisotropism:* Distinct, dark blue-gray to dark brown.
R: (400) — , (420) 45.0, (440) 44.4, (460) 44.7, (480) 45.6, (500) 47.0, (520) 48.7, (540) 50.1, (560) 51.3, (580) 52.3, (600) 53.2, (620) 54.0, (640) 54.9, (660) 55.7, (680) 56.5, (700) 57.6

Cell Data: *Space Group:* n.d. $a = 7.546(2)$ $c = 43.18(1)$ $Z = 12$

X-ray Powder Pattern: Goodnews Bay, Alaska, USA.
2.286 (100), 2.177 (90), 1.226 (70), 1.200 (70), 0.9355 (60), 2.022 (50), 1.577 (40)

Chemistry:

	(1)	(2)	(3)
Pd	72.3	68.9	69.3
Cu	< 0.1	1.8	2.3
Sn		0.3	
Sb	24.7	27.4	28.0
As	3.3	1.9	2.2
Total	100.4	100.3	101.8

(1) Goodnews Bay, Alaska, USA; by electron microprobe, average of four grains and five areas; corresponding to $Pd_{8.26}(Sb_{2.46}As_{0.54})_{\Sigma=3.00}$. (2) Tweefontein Farm, South Africa; by electron microprobe, corresponding to $(Pd_{7.68}Cu_{0.34})_{\Sigma=8.02}(Sb_{2.67}As_{0.30}Sn_{0.03})_{\Sigma=3.00}$. (3) Oktyabr mine, Russia; by electron microprobe, corresponding to $(Pd_{7.53}Cu_{0.42})_{\Sigma=7.95}(Sb_{2.66}As_{0.34})_{\Sigma=3.00}$.

Occurrence: As fine grains in precious metal placer concentrates, apparently derived from an ultramafic source rock (Goodnews Bay, Alaska, USA); above massive cubanite–mooihoekite ore (Oktyabr mine, Russia).

Association: Gold, sperrylite, laurite, platarsite, ruthenarsenite, mertieite-I, genkinite, Pt–Ir–Os alloys, Pt–Fe alloy, stibiopalladinite, chalcocite, bornite, heazlewoodite, galena, chalcopyrite, pentlandite, valleriite, hauchecornite, parkerite, chromite.

Distribution: In the USA, from the placers at Goodnews Bay, Alaska [TL]; at the Stillwater complex, Montana. In the Wellgreen Ni–Cu–PGE deposit, Yukon Territory, Canada. From Tweefontein Farm, 26 km from Potgietersrus, and at the Onverwacht mine, in the Merensky Reef, Bushveld complex, Transvaal, South Africa. From the Oktyabr mine, Noril'sk area, western Siberia, and around Zlatoust, Ural Mountains, Russia. At Hope's Nose, Torquay, Devon, England. From the Konttijärvi intrusion, northern Finland. In Australia, at the Round Hill deposit, Moorkaie Hill, northeast of Broken Hill, New South Wales. From the Baula conplex, Orissa, India. There are additional localities known, with material close in composition, but not fully confirmed as this species.

Name: To honor John B. Mertie, Jr. (1888–1980), geologist, U.S. Geological Survey, who provided the original material; "II" to distinguish its unique composition and crystallography from that of mertieite-I and isomertieite.

Type Material: n.d.

References: (1) Desborough, G.A., J.J. Finney, and B.F. Leonard (1973) Mertieite, a new palladium mineral from Goodnews Bay, Alaska. Amer. Mineral., 58, 1–10. (2) Cabri, L.J., J.H.G. Laflamme, J.M. Stewart, J.F. Rowland, and T.Z. Chen (1975) New data on some platinum arsenides and antimonides. Can. Mineral., 13, 321–335. (3) Cabri, L.J. and T.Z. Chen (1976) Stibiopalladinite from the type locality. Amer. Mineral., 61, 1249–1254. (4) Cabri, L.J., Ed. (1981) Platinum group elements: mineralogy, geology, recovery. Can. Inst. Min. & Met., 119–120, 159. (5) Clark, A.M. and A.J. Criddle (1982) Palladium minerals from Hope's Nose, Torquay, Devon. Mineral. Mag., 46, 371–377.