

**Crystal Data:** Hexagonal. *Point Group:*  $6/m\ 2/m\ 2/m$ . As tiny blebs; crystal outlines seldom displayed, grain boundaries being commonly embayed.

**Physical Properties:** Hardness = n.d. VHN = 419–442, 431 average (100 g load).  
D(meas.) = 10.2 D(calc.) = 10.16

**Optical Properties:** Opaque. *Color:* In reflected light, white with bluish tint compared to arsenopalladinite. *Luster:* Metallic. *Pleochroism:* Very weak, in pale yellow to pale bluish gray. *Anisotropism:* Distinct.

$R_1$ – $R_2$ : (400) 46.1–48.3, (420) 47.4–49.8, (440) 48.5–50.9, (460) 49.7–52.4, (480) 50.8–53.6, (500) 51.9–54.8, (520) 53.0–55.8, (540) 54.0–56.7, (560) 54.8–57.3, (580) 55.7–57.8, (600) 56.4–58.3, (620) 57.0–58.5, (640) 57.4–58.6, (660) 57.6–58.7, (680) 57.9–59.0, (700) 58.2–59.1

**Cell Data:** *Space Group:*  $P6/mmm$ .  $a = 6.798$   $c = 3.483$   $Z = 2$

**X-ray Powder Pattern:** Itabira, Brazil.

2.423 (vvs), 2.246 (vs), 1.371 (s), 1.302 (s), 1.259 (s), 1.871 (ms), 1.034 (ms)

**Chemistry:**

	(1)	(2)
Pd	66.0	67.15
Pt		1.96
Hg	14.9	13.79
Au	0.5	0.47
Fe		0.08
Cu	0.1	< 0.07
As	19.0	17.48
Sb	0.1	
Total	100.6	100.93

(1) Itabira, Brazil; by electron microprobe; corresponds to  $(\text{Pd}_{2.66}\text{Hg}_{0.32}\text{Cu}_{0.01}\text{Au}_{0.01})_{\Sigma=3.00}\text{As}_{1.09}$ .

(2) Serra Pelada, Brazil; by electron microprobe, corresponds to  $(\text{Pd}_{2.67}\text{Hg}_{0.29}\text{Pt}_{0.04}\text{Au}_{0.01}\text{Fe}_{0.01})_{\Sigma=3.02}\text{As}_{1.09}$ .

**Occurrence:** In concentrates from gold washings.

**Association:** Arsenopalladinite, palladseite, ismertieite, hematite (Itabira, Brazil).

**Distribution:** In Brazil, from Itabira [TL], and in the Cauê and Conceição iron mines, Minas Gerais, and in the Serra Pelada Au–Pd–Pt deposit, Pará. In the Merensky Reef, Bushveldt complex, Transvaal, South Africa. Found around Zlatoust, Ural Mountains, Russia.

**Name:** After the Greek goddess *Pallas Athene*, in allusion to its palladium content.

**Type Material:** The Natural History Museum, London, England, 1934,72, 1977,259; National Museum of Natural History, Washington, D.C., USA, 142504.

**References:** (1) Clark, A.M., A.J. Criddle, and E.E. Fejer (1974) Palladium arsenide–antimonides from Itabira, Minas Gerais, Brazil. *Mineral. Mag.*, 39, 528–543. (2) (1974) *Amer. Mineral.*, 59, 1330 (abs. ref. 1). (3) Cabral, A.R., B. Lehmann, R. Kwitko-Ribeiro, and C.H. Cravo Costa (2002) Palladium and platinum minerals from the Serra Pelada Au–Pd–Pt deposit, Carajás mineral province, northern Brazil. *Can. Mineral.*, 40, 1451–1463. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 28.