

Crystal Data: Monoclinic. *Point Group:* 2/m. Anhedral crystals, to several hundred μm , aggregated in grains; in intimate intergrowths with jagu ite to 500 μm . *Twinning:* Fine polysynthetic and parquetlike, characteristic; twin law matrix [100/01.0/1.01.], (001) twin plane.

Physical Properties: *Tenacity:* Slightly brittle. VHN = 371-421, 395 average (100 g load). Hardness = ~5 D(meas.) = n.d. D(calc.) = 8.38

Optical Properties: Opaque. *Color:* Silvery gray. *Streak:* Black. *Luster:* Metallic. *Optical Class:* Biaxial. *Birefractance:* Weak to moderate. *Anisotropism:* Moderate; rose-brown, gray-green, pale bluish gray, dark steel-blue. *Pleochroism:* Slight; pale buff to gray-green buff. R₁-R₂: (400) 35.6-43.3, (420) 36.8-44.2, (440) 37.8-45.3, (460) 39.1-46.7, (480) 40.0-47.5, (500) 41.1-48.0, (520) 42.1-48.5, (540) 42.9-48.7, (560) 43.5-49.1, (580) 44.1-49.3, (600) 44.4-49.5, (620) 44.6-49.6, (640) 44.5-49.3, (660) 44.4-49.2, (680) 44.2-49.1, (700) 44.0-49.0

Cell Data: *Space Group* P2₁/c. *a* = 5.676(2) *b* = 10.342(4) *c* = 6.341(2) β = 114.996(4)° *Z* = 2

X-ray Powder Pattern: Hope's Nose, England.
2.742 (100), 1.956 (100), 2.688 (80), 2.868 (50b), 2.367 (50), 1.829 (30), 2.521 (20)

Chemistry:	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Pd	37.64	35.48	38.64	37.52	Cu	0.18	2.05	3.09
Pt		0.70			Se	36.39	38.50	37.54
Hg		0.36			Total	99.30	101.16	99.84
Ag	25.09	24.07	20.55	25.36				100.00

(1) Hope's Nose, England; by electron microprobe, average of 26 analyses; corresponding to (Ag_{2.01}Cu_{0.02}) Σ =2.03Pd_{3.02}Se_{3.95}. (2) Copper Hills prospect, Australia; by electron microprobe, corresponding to (Ag_{1.86}Cu_{0.27}Hg_{0.02}) Σ =2.15(Pd_{2.77}Pt_{0.03}) Σ =2.80Se_{4.06}. (3) El Chire prospect, Argentina; electron microprobe analysis, corresponds to Ag_{1.6}Cu_{0.4}Pd₃Se₄. (4) Ag₂Pd₃Se₄.

Polymorphism & Series: Forms a limited solid-solution series with jagu ite.

Occurrence: In gold-bearing calcite veins in limestone (Hope's Nose, England); in a carbonate matrix (Tilkerode, Germany); in malachite nodules (Copper Hills prospect, Australia). In a telethermal selenide vein deposit (El Chire prospect, Argentina).

Association: Gold, fischesserite, clausthalite, tiemannite, eucairite, verbeekite, umangite, cerussite, bromian chlorargyrite (Hope's Nose, England); clausthalite, tischendorfite, tiemannite, stibiopalladinite, gold (Tilkerode, Germany); oosterboschite, naumannite, berzelianite, umangite, tiemannite, chalconite, malachite, quartz (Copper Hills prospect, Australia). Jagu ite, clausthalite, naumannite, tiemannite, klockmannite, berzelianite, umangite, aguilarite, mercurian silver, native gold, calcite (El Chire prospect, Argentina).

Distribution: From Hope's Nose, Torquay, Devon, England [TL]. At Tilkerode, Harz Mountains, Germany. In the Copper Hills prospect, East Pilbara region, Western Australia. From the El Chire prospect, 30 km northwest of the village of Vinchina, Los Llantenes mining district, La Rioja Province, Argentina.

Name: In honor of Dr. Chris J. Stanley (b. 1954), The Natural History Museum, London, England, for his contributions to ore mineralogy.

Type Material: Institute for Mineralogy, Salzburg University, Salzburg, Austria, II/A 1070; The Natural History Museum, London, England, 1997,59, E1527, E1534, E1537, E1538.

References: (1) Paar, W.H., A.C. Roberts, A.J. Criddle, and D. Topa (1998) A new mineral, chrisstanleyite, Ag₂Pd₃Se₄, from Hope's Nose, Torquay, Devon, England. *Mineral. Mag.*, 62, 257-264. (2) (1998) *Amer. Mineral.*, 83, 1348 (abs. ref. 1). (3) Nickel, E.H. (2002) An unusual occurrence of Pd, Pt, Au, Ag and Hg minerals in the Pilbara region of Western Australia. *Can.*

Mineral., 40, 419-433. (4) Topa, D., E. Makovicky, and T. Balić-Žunić (2006) The crystal structures of jaguéite, $\text{Cu}_2\text{Pd}_3\text{Se}_4$, and chrisstanleyite, $\text{Ag}_2\text{Pd}_3\text{Se}_4$. Can. Mineral., 44, 497-505. (5) (2006) Amer. Mineral., 91(11), 1951 (abs. ref. 4).