Palladodymite Pd_2As

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As inclusions to 70 μm in native ruthenium.

Physical Properties: *Cleavage*: None. *Fracture*: n.d. *Tenacity*: Brittle. Hardness = ~5 VHN = 546-611, 566 average (20 g load). D(meas.) = n.d. D(calc.) = 11.3

Optical Properties: Opaque. *Color*: In reflected light, brownish gray with a bluish tint.
Streak: n.d. *Luster*: n.d.
Optical Class: Distinctly anisotropic from bluish gray to reddish brown.
R_1-R_2: (480) 51.6-45.8, (560) 54.8-46.9, (580) 56.2-48.0, (660) 59.1-50.2

Cell Data: *Space Group*: *Pnma*. a = 5.91(2) b = 3.90(1) c = 7.34(2) Z = 4

X-ray Powder Pattern: Upper Miass River, southern Urals, Russia.
2.43 (100), 2.24 (50), 1.838 (30), 2.06 (10), 1.710 (10), 1.484 (10), 1.380 (10)

Chemistry	(1)	(2)
Ru	2.4	
Rh	27.6	31.75
Pd	33.5	44.18
Ir	1.7	
Os	1.0	
Pt	4.4	1.53
Ni	3.0	
As	26.5	23.44
Total	100.1	101.46

(1) Upper Miass River, southern Urals, Russia; average of 4 electron microprobe analyses; corresponds to $(Pd_{0.90}Rh_{0.77}Ni_{0.15}Ru_{0.07}Pt_{0.06}Ir_{0.03}Os_{0.02})_{\Sigma=2.00}As_{1.01}$. (2) Umsweswe River, Zimbabwe; electron microprobe analysis; total includes Fe = 0.14, Cu = 0.24, Te = 0.18.

Polymorphism & Series: Polymorphous with palladoarsenide and palladobismutharsenide.

Occurrence: In a small fluvial placer deposit (Russia, Zimbabwe); in chromitite xenoliths in ultramafic pipes (South Africa).

Association: Ruthenium, isoferroplatinum, cherepanovite, irarsite, hongshiite, sperrylite, tulameenite (Russia); Pd- and Rh-bearing platinum (Zimbabwe).

Distribution: From the upper Miass River, southern Urals, Russia. In the Onverwacht and Tweefontein ultramafic pipes, eastern Bushveld Complex, in South Africa. In Umsweswe River sediment, Zimbabwe.

Name: Alludes to the chemical composition and relationship to the Rh analog, rhodarsenide (palladium and *dymos*, the latter the Greek for twin).

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

References: (1) Britvin, S.N., N.S. Rudashevsky, A.N. Bogdanova, and D.K. Shcherbachov (1999) Palladodymite $(Pd,Rh)_2As$, a new mineral from a placer of the Miass River, Urals. Zapiski Vseross. Mineral. Obshch., 128(2), 39-42 (in Russian, English abs.). (2) (2000) Amer. Mineral., 85, 876 (abs. ref. 1). (3) Oberthür, T., T.W. Weiser, F. Melcher, L. Gast, and C. Wöhrl (2013) Detrital platinum-group minerals in rivers draining the Great Dyke, Zimbabwe. Can. Mineral., 51(2), 197-222.