Malyshevite $PdCuBiS_3$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As grains and rims.

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: Uneven. Hardness = 3
D(meas.) = n.d. D(calc.) = 6.025

Optical Properties: Opaque. *Color*: Lead-gray; white in reflected light. *Streak*: n.d.
Luster: Metallic.
Optical Class: *Anisotropism*: Moderate to strong, light yellow tones.
R_1-R_2: (470) 34.1-28.7, (546) 36.3-33.0, (589) 37.0-34.4, (650) 37.4-34.6

Cell Data: *Space Group*: *Pnam*. *a* = 7.541(3) *b* = 6.4823 (3) *c* = 11.522(3) Z = 4

X-Ray Diffraction Pattern: Srednyaya Padma mine, southern Karelia, Russia.
1.900 (10), 2.88 (8), 2.52 (6), 3.24 (4), 1.715 (2), 1.672 (2), 3.77 (1)

Chemistry:

	(1)	(2)
Pd	20.6	21.24
Pt	1.0	0.38
Pb	0.8	
Bi	42.6	43.58
Ni		0.45
Fe		0.59
Cu	13.1	13.37
Se	2.2	0.55
S	19.0	19.99
Total	99.3	100.15

(1) Srednyaya Padma mine, southern Karelia, Russia; average electron microprobe analysis; corresponds to $(Pd_{0.94}Pt_{0.02}Pb_{0.02})_{\Sigma=0.98}Bi_{0.98}Cu_{1.00}(S_{2.87}Se_{0.13})_{\Sigma=3.00}$. (2) Wisner South Zone, Sudbury Complex, Ontario, Canada; average electron microprobe analysis.

Occurrence: In the contact aureole of an impact melt sheet (Sudbury); in a U-V-precious metals deposit in albite-mica-carbonate metasomites (Srednyaya Padma).

Association: Clausthalite, padmaite, quartz (Srednyaya Padma); lisiguangite (Sudbury).

Distribution: From the Srednyaya Padma mine, southern Karelia, Russia [TL]. From the Yanshan Mountains, Hebei, China. In the Sudbury Igneous Complex, Ontario, Canada.

Name: Honors Ilya Ilyich *Malyshev* (1904-1973), discoverer of the Samotkansky titanium ore deposit in the Urals, and his son, Professor V.I. *Malyshev* (1927-2002).

Type Material: A.E. Fersman Mineral Museum, RAS, Moscow, Russia (3356/1).

References: (1) Chernikov, A.A., N.I. Chistykova, O.M. Uvarkina, V.T. Dubinchuk, V.A. Rassulov, and Y.S. Polehovsky (2006) Malyshevite - A new mineral from Srednyaya Padma deposit in Southern Karelia (in Russian). New Data on Minerals. Moscow 41, 14-17. (2) Péntek, A., F. Molnár, G. Tuba, D.H. Watkinson, and P.C. Jones (2013) The Significance of Partial Melting Processes in Hydrothermal Low Sulfide Cu-Ni-PGE Mineralization Within the Footwall of the Sudbury Igneous Complex, Ontario, Canada. Econ. Geol., 108(1), 59-78.