

**Crystal Data:** Tetragonal. *Point Group:* 4/m 2/m 2/m. As a discontinuous rim, to 50–60 μm, on an isoferroplatinum grain.

**Physical Properties:** *Cleavage:* None observed. *Fracture:* n.d. *Tenacity:* Poorly malleable. Hardness = n.d. VHN = 353.8 to 382.0 (50 g load). D(meas.) = n.d. D(calc.) = 11.16

**Optical Properties:** Opaque. *Color:* Steel-white, with a slight cream tint; white with a slight grayish beige tint, in reflected light. *Streak:* n.d.

*Luster:* Metallic.

*Optical Class:* n.d.

R: (400) 63.2, (420) 57.0, (440) 54.7, (460) 55.8, (480) 58.0, (500) 59.4, (520) 60.5, (540) 61.4, (560) 62.2, (580) 63.1, (600) 63.7, (620) 64.2, (640) 64.8, (660) 65.9, (680) 66.9, (700) 68.6

**Cell Data:** *Space Group:* P4/mmm [probable]. *a* = 6.00 (2) *c* = 8.50 (3) *Z* = 3

**X-ray Powder Pattern:** Konder River, Khabarovsk region, Russia.

2.13 (100), 1.224 (80), 1.059 (40), 1.501 (30), 1.346 (20), 3.00 (10), 2.67 (10)

<b>Chemistry:</b>	(1)
Pt	4.06
Pd	58.19
Fe	1.41
Cu	27.26
<u>Zn</u>	<u>8.02</u>
Total	98.94

(1) Konder River, Khabarovsk region, Russia; average 18 electron microprobe analyses corresponding to (Pd<sub>3.822</sub>Pt<sub>0.145</sub>)<sub>Σ=3.967</sub>Cu<sub>2.998</sub>(Zn<sub>0.857</sub> Fe<sub>0.177</sub>)<sub>Σ=1.034</sub>.

**Occurrence:** As rims on isoferroplatinum grains in alluvial placer sediment derived from a concentrically zoned, alkaline ultramafic massif.

**Association:** Isoferroplatinum, titanite, perovskite, V-bearing magnetite, bornite, chlorite.

**Distribution:** From the Konder River PGM placer deposit, Ayan-Maya district, Khabarovsk region, Russia.

**Name:** Honors Professor Nikolai Stefanovich Bortnikov, mineralogist and researcher at the Russian Academy of Sciences.

**Type Material:** Mineralogical Museum, St. Petersburg State University, Russia.

**References:** (1) Mochalov, A.G., M.D. Tolkachev, Y.S. Polekhovskiy, and E.M. Goryacheva (2007) Bortnikovite, Pd<sub>4</sub>Cu<sub>3</sub>Zn, a new mineral species from the unique Konder placer deposit, Khabarovsk krai, Russia. *Geology of Ore Deposits*, 49(4), 318–327. (2) (2008) *Amer. Mineral.*, 93, 705 (abs. ref. 2).