

**Crystal Data:** Cubic. *Point Group:*  $\bar{4}3m$ . As anhedral grains to 0.2 mm.

**Physical Properties:** *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~3.5 VHN = 166-174, 170 average (10 g load). D(meas.) = n.d. D(calc.) = 4.744

**Optical Properties:** Opaque. *Color:* Black; light gray in reflected light. *Streak:* Black. *Luster:* Metallic.

*Optical Class:* Isotropic.

R: (400) 24.90, (420) 25.02, (440) 25.21, (460) 25.43, (470) 25.54, (480) 25.64, (500) 25.87, (520) 26.11, (540) 26.41, (546) 26.49, (560) 26.71, (580) 27.06, (589) 27.26, (600) 27.47, (620) 27.52, (640) 27.83, (650) 27.90, (660) 27.98, (680) 28.39, (700) 28.83

**Cell Data:** Space Group:  $I\bar{4}3m$ .  $a = 10.2390(7)$   $Z = 2$

**X-ray Powder Pattern:** Vorontsovskoe gold deposit, Northern Urals, Russia. 2.952 (100), 4.175 (93), 2.735 (57), 1.810 (40), 1.543 (24), 2.562 (18), 3.646 (13)

Chemistry:	(1)	(2)
Hg	25.13	
Fe	9.89	22.67
Zn	1.16	
Cu	3.95	5.18
Ag	0.45	
Tl	12.93	16.57
Cs	0.44	
Pb	0.04	
As	17.83	24.32
Sb	2.15	
Te	0.40	
S	22.91	31.26
Se	0.00	
Total	99.28	100.00

(1) Vorontsovskoe gold deposit, Northern Urals, Russia; average of 10 electron microprobe analyses; corresponds to [(Fe<sub>2.74</sub>Hg<sub>1.94</sub>Zn<sub>0.27</sub>)<sub>Σ=4.95</sub>(Cu<sub>0.96</sub>Ag<sub>0.06</sub>)<sub>Σ=1.02</sub>](Tl<sub>0.98</sub>Cs<sub>0.05</sub>)<sub>Σ=1.03</sub>(As<sub>3.68</sub>Sb<sub>0.27</sub>Te<sub>0.05</sub>)<sub>Σ=4.00</sub>S<sub>12.00</sub>. (2) (Fe<sub>5</sub>Cu)TlAs<sub>4</sub>S<sub>12</sub>.

**Occurrence:** In mineralized limestone breccias (calcite-dolomite, up to 85% of volume) in the ores of the sulfide-carbonate type in a gold deposit of uncertain origin.

**Association:** Cinnabar, realgar, stibnite, pyrite, dolomite, calcite.

**Distribution:** At the Vorontsovskoe gold deposit, 0.5 km west of Vorontsovka, 13 km south of Krasnotur'insk, Sverdlovskaya Oblast', Northern Urals, Russia.

**Name:** Honors mining engineer Vladimir Vasilyevich *Vorontsov* (1842-later than 1908) for whom the city and mine are named where the new mineral was discovered. A prefix, *ferro*, indicates the iron analog of *vorontsovite*.

**Type Material:** A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4976/1).

**References:** (1) Kasatkin, A.V., F. Nestola, A.A. Agakhanov, R. Škoda, V.Y. Karpenko, M.V. Tsyganko, and J. Plášil (2018) Vorontsovite, (Hg<sub>5</sub>Cu)<sub>Σ6</sub>TlAs<sub>4</sub>S<sub>12</sub>, and ferrovorontsovite, (Fe<sub>5</sub>Cu)<sub>Σ6</sub>TlAs<sub>4</sub>S<sub>12</sub>: The Tl- and Tl-Fe-analogues of galkhaite from the Vorontsovskoe Gold Deposit, Northern Urals, Russia. *Minerals*, 8(5), 185. (2) (2020) *Amer. Mineral.*, 105, 1118-1119 (abs. ref. 1 and comment).