

**Crystal Data:** Tetragonal. *Point Group:*  $4/m\ 2/m\ 2m$ . As rounded to irregular grains, to 0.4 mm, which may have complex inclusions, typically associated with Pt–Fe alloys.

**Physical Properties:** Hardness = n.d. VHN = 420–456, 442 average (50 g load). D(meas.) = 14.9 (synthetic). D(calc.) = 15.62 Distinctly ferromagnetic.

**Optical Properties:** Opaque. *Color:* White in reflected light. *Luster:* Metallic. *Anisotropism:* Very weak.

R<sub>1</sub>–R<sub>2</sub>: (470) 61.0–65.3, (546) 60.0–66.5, (589) 61.5–65.5, (650) 61.1–64.9

**Cell Data:** *Space Group:*  $P4/mmm$ .  $a = 3.891(2)$   $c = 3.577(2)$   $Z = 1$

**X-ray Powder Pattern:** Tulameen River, Canada. 2.179 (100), 1.163 (80), 1.093 (80), 1.946 (70), 1.016 (60), 1.317 (50), 2.753 (40)

<b>Chemistry:</b>	(1)	(2)	(3)
Pt	73.98	76.7	76.57
Ir	1.99		
Fe	10.38	10.6	10.96
Cu	13.13	7.0	12.47
Ni	n.d.	3.8	
Sb	n.d.	2.1	
Total	99.48	100.2	100.00

(1) Similkameen River area, Canada; by electron microprobe, corresponding to  $(\text{Pt}_{1.94}\text{Ir}_{0.06})_{\Sigma=2.00}\text{Fe}_{1.06}\text{Cu}_{0.94}$ . (2) Tulameen River area, Canada; by electron microprobe, corresponding to  $\text{Pt}_{2.04}\text{Fe}_{0.98}(\text{Cu}_{0.56}\text{Ni}_{0.54}\text{Sb}_{0.08})_{\Sigma=1.18}$ . (3) Pt<sub>2</sub>FeCu.

**Occurrence:** In placers (Canada); in Uralian ultramafics (Nizhni Tagil, Russia); in Cu–Ni–PGM deposits in dunite-troctolite-gabbro (Ioko-Dovyren massif, Russia).

**Polymorphism & Series:** Forms a series with ferronickelplatinum.

**Association:** Pt–Fe alloys, geversite, chalcopyrite, chromite, magnetite.

**Distribution:** In Canada, from placers in the Tulameen and Similkameen River areas, British Columbia [TL]. In the Stillwater complex, Montana, and in the Salmon River placers, Goodnews Bay, Alaska, USA. From Guma Water, Sierra Leone. At Yubdo, Ethiopia. In Russia, from Nizhni Tagil, Ural Mountains; in a placer in the Upper Miask River, Southern Ural Mountains; in the Ioko-Dovyren massif, northern Baikal region, Siberia; at the Konder massif, Aldan Shield, Sakha.

**Name:** For the Tulameen River, Canada, from the vicinity of which the mineral was first noted.

**Type Material:** Royal Ontario Museum, Toronto, Canada, M33256; National Museum of Natural History, Washington, D.C., USA, 128460.

**References:** (1) Cabri, L.J., D.R. Owens, and J.H.G. Laflamme (1973) Tulameenite, a new platinum–iron–copper mineral from placers in the Tulameen River area, British Columbia. *Can. Mineral.*, 12, 21–25. (2) (1974) *Amer. Mineral.*, 59, 383–384 (abs. ref. 1). (3) Shahmiri, M., S. Murphy, and D.J. Vaughn (1985) Structural and phase equilibria studies in the system Pt–Fe–Cu and the occurrence of tulameenite (Pt<sub>2</sub>FeCu). *Mineral. Mag.*, 49, 547–554. [ck Z=1 here and for tetraferroPt and ferronickelPt??vs Strunz??] (4) Cabri, L.J., Ed. (1981) *Platinum group elements: mineralogy, geology, recovery*. *Can. Inst. Min. & Met.*, 145.

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