Tulameenite Pt_2FeCu

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_1–R_2: (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)

Chemistry:

	(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 $(Pt_{1.94}Ir_{0.06})_{\Sigma=2.00}Fe_{1.06}Cu_{0.94}$. (2) Tulameen River area, Canada; by electron microprobe, corresponding to $Pt_{2.04}Fe_{0.98}(Cu_{0.56}Ni_{0.54}Sb_{0.08})_{\Sigma=1.18}$. (3) Pt_2FeCu.

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 equilbria studies in the system Pt-Fe-Cu and the occurrence of tulameenite (Pt_2FeCu). 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.