Platinum Pt

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. Cubic crystals, typically distorted, to 1.5 cm; commonly as grains or scales, rarely as nuggets or lumps up to 30 kg. *Twinning:* On {111}, as interpenetrant contact twins.

Physical Properties: *Fracture:* Hackly. *Tenacity:* Malleable and ductile. Hardness = 4–4.5 VHN = 297–339 (100 g load). D(meas.) = 14–19 D(calc.) = 21.472 Nonmagnetic to distinctly magnetic when rich in iron.

Optical Properties: Opaque. *Color:* Whitish steel-gray to dark gray; in polished section, white. *Luster:* Metallic.
R: (400) 60.5, (420) 62.3, (440) 63.8, (460) 65.1, (480) 66.3, (500) 67.5, (520) 68.6, (540) 69.5, (560) 70.2, (580) 70.7, (600) 71.2, (620) 71.6, (640) 71.8, (660) 72.1, (680) 72.4, (700) 72.8

Cell Data: *Space Group:* $Fm3m$. a = 3.9231 Z = 4

X-ray Powder Pattern: Synthetic.
2.265 (100), 1.9616 (53), 1.1826 (33), 1.3873 (31), 0.8008 (29), 0.9000 (22), 0.8773 (20)

Chemistry:

	(1)	(2)	(3)
Pt	86.20	79.48	92.2
Ir	0.85	0.82	
Ir–Os	0.95	1.41	
Rh	1.40	0.75	1.2
Pd	0.50	0.49	1.3
Au	1.00	0.49	
Cu	0.60		0.5
Fe	7.80	16.50	5.3
gangue	0.95		
Total	100.25	99.94	100.5

(1) Chocó, Colombia; corresponds to $Pt_{0.71}Fe_{0.22}Rh_{0.02}Cu_{0.02}Ir_{0.01}Os_{0.01}Pd_{0.01}$. (2) Birbir River, Ethiopia; corresponds to $Pt_{0.56}Fe_{0.40}Rh_{0.01}Ir_{0.01}Os_{0.01}Pd_{0.01}$. (3) Nizhni Tagil, Russia; by electron microprobe, corresponds to $Pt_{0.79}Fe_{0.16}Rh_{0.02}Pd_{0.02}Cu_{0.01}$.

Occurrence: Chiefly in placer deposits, or in mafic and ultramafic igneous rocks; rarely in hydrothermal quartz veins or contact metamorphic deposits.

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

Distribution: From many deposits world-wide. In the Pinto River, near Papayan, in the Department of Chocó, Cauca, Colombia [TL]. In the USA, from Platinum Creek, Goodnews Bay, Alaska; in California, in a number of placers, as in Trinity Co.; and at Oroville, Butte Co. In Oregon, at Cape Blanco, Port Orford, Curry Co. In Canada, at Rivière-du-Loup and Rivière des Plantes, Beauce Co., Quebec; in British Columbia, in the Kamloops district, on the Fraser and Tranquille Rivers, and in the Similkameen district, on Granite, Cedar, and Olivine Creeks, tributaries to the Tulameen River; in Alberta, near Edmonton. In Russia, in the Ural Mountains, in a large district surrounding Nizhni Tagil; good crystals from the Konder massif, Aldan Shield, Sakha. In South Africa, at a number of deposits along the Merensky Reef of the Bushveld complex, Transvaal.

Name: From the Spanish *platina*, diminutive of *plata*, *silver*.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 106–109. (2) Cabri, L.J. and C.E. Feather (1975) Platinum–iron alloys; nomenclature based on a study of natural and synthetic alloys. Can. Mineral., 13, 117–126. (3) Harris, D.C. and L.J. Cabri (1991) Nomenclature of platinum-group element alloys: review and revision. Can. Mineral., 29, 231–237. (4) Hull, ?? and ?? Davey (1921) ??title?? Strukturberichte??, 1, 71–?? (5) (1953) NBS Circ. 539, 1, 31. (6) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 441.