Iridium (Ir, Os, Ru)

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. Generally cubic, commonly in rounded or angular grains. *Twinning:* On {111} in polysynthetic groups.

Physical Properties: *Cleavage:* Indistinct on {001}. *Fracture:* Hackly. *Tenacity:* Somewhat malleable. Hardness = 6–7 VHN = 946–988 D(meas.) = 22.65–22.84 D(calc.) = 22.66

Optical Properties: Opaque. *Color:* Silver-white with yellow tinge, gray on fracture. *Luster:* Very high metallic.

R: (400) 67.4, (420) 68.1, (440) 68.8, (460) 69.3, (480) 69.6, (500) 69.9, (520) 70.2, (540) 70.7, (560) 71.6, (580) 71.9, (600) 72.5, (620) 73.2, (640) 73.4, (660) 73.8, (680) 74.4, (700) 74.4

Cell Data: *Space Group: Fm3m.* a = 3.8394 Z = 4

X-ray Powder Pattern: Synthetic.
2.2170 (100), 1.9197 (50), 1.1574 (45), 0.7838 (45), 1.3575 (40), 0.8808 (40), 0.8586 (40)

Chemistry:

	(1)	(2)	(3)
Ir	76.85	64.7	49.6
Pt	19.64		21.8
Pd	0.89		
Ru		1.6	23.9
Os		33.4	2.1
Cu	1.78	0.6	0.5
Fe		0.3	0.2
Total	99.16	100.6	98.1

(1) Nizhni Tagil, Russia; corresponds to $(Ir_{0.74}Pt_{0.19}Cu_{0.05}Pd_{0.02})_{\Sigma=1.00}$. (2) Sorashigawa placer, Japan; by electron microprobe, corresponds to $(Ir_{0.62}Os_{0.32}Ru_{0.03}Cu_{0.02}Fe_{0.01})_{\Sigma=1.00}$. (3) Do.; by electron microprobe, corresponds to $(Ir_{0.41}Ru_{0.38}Pt_{0.18}Os_{0.02}Cu_{0.01})_{\Sigma=1.00}$.

Occurrence: As exsolution particles in Pt–Fe alloys.

Association: Platinum, Pt–Fe alloys.

Distribution: From Nizhni Tagil, Ural Mountains, Russia. In Japan, at the Sorashigawa placer, ?? Prefecture, elsewhere??. In Canada, from Bear Creek, in the Tulameen River district, British Columbia, and at the Wellgreen Ni–Cu–PGE deposit, Yukon Territory. In the USA, from Goodnews Bay, Alaska, and in the Boss mine, Goodsprings district, Clark Co., Nevada. On the Witwatersrand, South Africa. In the Ioma placer, Waria River, Yodda goldfield, Papua New Guinea

Name: From the Latin *iris*, *rainbow*, as the element's compounds are typically highly colored.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 110–111. (2) Harris, D.C. and L.J. Cabri (1973) The nomenclature of the natural alloys of osmium, iridium and ruthenium based on new compositional data of alloys from world-wide occurrences. Can. Mineral., 12, 104–112. (3) Harris, D.C. and L.J. Cabri (1991) Nomenclature of platinum-group element alloys: review and revision. Can. Mineral., 29, 231–237. (4) (1955) NBS Circ. 539, 4, 9–10. (5) Cabri, L.J., Ed. (1981) Platinum group elements: mineralogy, geology, recovery. Can. Inst. Min. & Met., 111–112. (6) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 253.