Ishikawaite $(U, Fe, Y)NbO_4$

Crystal Data: Orthorhombic. *Point Group*: n.d. As prismatic crystals, tabular on {100}, with nine forms noted, to 1 cm.

Physical Properties: *Fracture*: Conchoidal. Hardness = 5-6 D(meas.) = 6.2-6.4 D(calc.) = n.d. Radioactive. Partially to completely metamict.

Optical Properties: Opaque. *Color*: Black. *Streak*: Dark brown to black. *Luster*: Waxy, resinous to vitreous.
Optical Class: Isotropic.

Cell Data: *Space Group*: n.d. Z = n.d.

X-ray Powder Pattern: Ishikawa district, Japan.
2.972 (100), 3.103 (98), 3.73 (38), 2.615 (30), 2.476 (28), 2.819 (26), 3.60 (22)

Chemistry:

	(1)	(2)		(1)	(2)
Nb_2O_5	37.8	39.5	Al_2O_3	0.22	
Ta_2O_5	5.77	5.13	RE_2O_3	7.40	9.17
WO_3	1.86		Fe_2O_3	2.64	
TiO_2	0.45	0.59	FeO	6.26	9.47
SnO_2	0.12	1.52	MnO	2.02	2.10
ThO_2	3.27	6.39	ZrO_2	0.36	
UO_2	31.8	23.6	CaO	0.07	0.11
Na_2O	0.03		Total	100.07	97.60

(1) Ishikawa district, Japan; average electron microprobe analysis; corresponds to $(U_{0.354}Fe_{0.262}Mn_{0.086}Y_{0.081}REE_{0.077}Th_{0.037}W_{0.024})(Nb_{0.854}Ta_{0.078}Ti_{0.017}Fe^{3+}_{0.099})O_4$. (2) Honeycomb Hill, USA; by electron microprobe, $RE_2O_3 = Y_2O_3$ 1.05%, La_2O_3 0.03%, Ce_2O_3 0.41%, Nd_2O_3 0.73%, Sm_2O_3 0.33%, Gd_2O_3 0.50%, Tb_2O_3 0.21%, Dy_2O_3 1.37%, Er_2O_3 1.27%, Yb_2O_3 2.87%, Lu_2O_3 0.40%.

Mineral Group: Samarskite group (U+Th dominant in the A site).

Occurrence: In pegmatite, and alluvium (Ishikawa district, Japan); as micro-inclusions in vitrophyre clasts in highly differentiated, rare-element rich, pyroclastic rhyolites (Honeycomb Hills, USA).

Association: Samarskite, ferrocolumbite (Ishikawa district, Japan).

Distribution: From the Ishikawa district, Fukushima Prefecture, Japan. Reported from other localities in Japan and elsewhere, but confirmation is impossible, lacking type material. From Kunar, Afghanistan. Material from the Honeycomb Hills, Juab Co., Utah, USA, for example, seems very similar but is regarded as uranoan samarskite.

Name: For the occurrence in the *Ishikawa* district, Japan.

Type Material: Destroyed.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 766. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 533. (3) Nambu, M., Ed. (1970) Introduction to Japanese minerals, Geol. Surv. Japan, 104-105. (4) Congdon, R.D. and W.P. Nash (1991) Eruptive pegmatite magma: rhyolite of the Honeycomb Hills, Utah. Amer. Mineral., 76, 1261-1278. (5) Hanson, S.L., W.B. Simmons, A.U. Falster, E.E. Foord, and F.E. Lichte (1999) Proposed nomenclature for samarskite-group minerals: new data on ishikawaite and calciosamarskite. Mineral. Mag., 63, 27-36.