

Samarskite-(Y)

(Y, Fe³⁺, U)(Nb, Ta)O₄

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Crystal Data: Orthorhombic; metamict. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals, typically rough, elongated || [001], to 12 cm, pyramidal terminations, cross-sections rectangular, flattened on {100} or {010}; commonly granular, massive.

Physical Properties: *Cleavage:* {010}, indistinct. *Fracture:* Conchoidal to small conchoidal. *Tenacity:* Brittle. Hardness = 5–6 VHN = 736–897 D(meas.) = 5.0–5.69 D(calc.) = [6.28] Radioactive.

Optical Properties: Opaque, transparent in thin fragments. *Color:* Velvet-black, may have a brownish tint, brown to yellowish brown due to alteration; light to dark brown in transmitted light. *Streak:* Dark reddish brown to black, yellow-brown; gray when altered. *Luster:* Vitreous to resinous, may be submetallic, splendent; externally dull.

Optical Class: Isotropic. $n = 2.1\text{--}2.2$

Cell Data: *Space Group:* $Pbcn$, probable; heated at 550 °C in H₂ atmosphere for 16 hours. $a = 5.687$ $b = 4.925$ $c = 5.210$ $Z = [2]$

X-ray Powder Pattern: Kawabe, Japan; after heating at 550 °C in hydrogen for 16 hours. 3.030 (100), 3.728 (15), 2.843 (15), 2.603 (15), 2.495 (10), 1.920 (10), 1.863 (10)

Chemistry:		(1)	(2)	(1)	(2)	(1)	(2)
UO ₃	11.23			SnO ₂	0.79	FeO	11.15
WO ₃	1.41	2.1		Al ₂ O ₃	0.19	MnO	0.69
U ₃ O ₈		29.6		Y ₂ O ₃	7.83	ZnO	0.17
Nb ₂ O ₅	32.02	38.3		La ₂ O ₃	0.37	PbO	0.15
Ta ₂ O ₅	11.18	10.2		Ce ₂ O ₃	0.25	MgO	0.41
SiO ₂	0.12			Dy ₂ O ₃	1.56	CaO	0.51
TiO ₂	0.68	0.2		Er ₂ O ₃	13.37	Na ₂ O	0.28
ZrO ₂	1.03	0.6		Fe ₂ O ₃	2.13	K ₂ O	0.21
ThO ₂	1.73	1.3		Sb ₂ O ₃		H ₂ O	1.22
					0.2	rem.	0.07
						Total	100.75
							98.8

(1) Miass, Russia. (2) Kawabe, Japan; by ICP, corresponds to A_{0.99}B_{1.01}O₄.

Occurrence: An accessory mineral in RE-rich granite pegmatites, common but not abundant; rarely as a detrital mineral.

Association: Columbite, zircon, monazite, uraninite, aeschynite, magnetite, albite, topaz, beryl, garnet, muscovite, biotite.

Distribution: A few localities for analyzed material include: at Miass, Ilmen Mountains, Southern Ural Mountains, Russia. From the Änneröd, Iveland, and Setesdal districts, Norway. In the USA, at Glastonbury, Hartford Co., Connecticut; in the Mitchell pegmatite, Bedford Co., Virginia; around Spruce Pine, Mitchell Co., North Carolina; near Nuevo, Riverside Co., California; at the Addey claims, along Texas Creek, Fremont Co., Colorado; and in the New Year's Eve mine, Sierrita Mountains, Pima Co., Arizona. At Divina de Uba, near Belo Horizonte, Minas Gerais, Brazil. In Madagascar, from Ambatofotsikely, Antsirabe, Ampangabé, and elsewhere. At Kivu, Kivu Province, Congo (Zaire). In Japan, especially in the Ishikawa district, Fukushima Prefecture. Many other localities are known.

Name: To honor Colonel Vasiliï Evgrafovich von Samarskii-Bykhovets (1803–1870), Chief of Staff of the Russian Corps of Mining Engineers.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 797–801, 806–807 [ampangabéite]. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 526–533, 542–545 [ampangabéite]. (3) Sugitani, Y., Y. Suzuki, and K. Nagashima (1985) Polymorphism of samarskite and its relationship to other structurally related Nb–Ta oxides with the α -PbO₂ structure. *Amer. Mineral.*, 70, 856–866.

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