Calciosamarskite $(Ca, Fe, Y)(Nb, Ta, Ti)O_4$

Crystal Data: Orthorhombic; metamict. *Point Group*: 2/*m* 2/*m* 2/*m.* As anhedral masses.

Physical Properties: *Cleavage*: None. *Fracture*: Conchoidal. *Tenacity*: Brittle.
Hardness = 5-6 D(meas.) = 5.8(1) D(calc.) = n.d. Radioactive.

Optical Properties: Opaque. *Color*: Black. *Streak*: Brown to black. *Luster*: Vitreous.
Optical Class: Isotropic. $n > 2.0$

Cell Data: *Space Group*: n.d. $a = 5.632$ $b = 9.912$ $c = 5.221$ $\beta = 93.87°$

X-ray Powder Pattern: Mitchell Co., North Carolina, USA. (After heating at 1100 °C for 12 hours)
2.952 (100), 3.079 (90), 2.599 (35), 3.867 (30), 2.824 (30), 3.614 (25), 1.839 (20)

Chemistry:

	(1)		(1)		(1)
UO_2	17.9	Sc_2O_3	1.09	Er_2O_3	0.38
WO_3	1.83	Tb_2O_3	0.11	Yb_2O_3	0.48
Nb_2O_5	37.4	Y_2O_3	6.90	Lu_2O_3	0.12
Ta_2O_5	5.57	Pr_2O_3	0.03	MnO	0.79
SiO_2	0.21	Ce_2O_3	0.05	PbO	0.70
TiO_2	1.17	Dy_2O_3	1.38	MgO	0.01
ThO_2	3.75	Nd_2O_3	0.50	CaO	6.17
SnO_2	0.10	Fe_2O_3	7.40	Na_2O	0.84
Al_2O_3	0.15	Sm_2O_3	0.29	H_2O	n.d.
Gd_2O_3	0.97	Ho_2O_3	0.21	Total	96.5

(1) Mitchell Co., North Carolina, USA; average electron microprobe analysis; corresponds to $(Ca_{0.309}Fe_{0.261}U_{0.186}Y_{0.172}REE_{0.114}Na_{0.077}Th_{0.04}Mn_{0.031})_{\Sigma=1.19}(Nb_{0.791}Ta_{0.071}Ti_{0.041})_{\Sigma=0.903}O_4$.

Mineral Group: Samarskite group.

Occurrence: An accessory mineral in RE-rich granite pegmatites, common but not abundant.

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

Distribution: From Mitchell Co., North Carolina, USA. At the Woodcox mine, Hybla, Monteagle township, Hastings county, Ontario, Canada.

Name: Honors Colonel Vasilii Evgrafovich von *Samarsk*ii-Bykhovets (1803-1870), Chief of Staff of the Russian Corps of Mining Engineers. The prefix, *calcio*, indicates Ca is dominant in the A-site.

Type Material: n.d.

References: (1) 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(1), 27-36. (2) Ellsworth H.V. (1928) A mineral related to samarskite from the Woodcox Mine, Hybla Ontario. Amer. Mineral., 13, 63-65. (3) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 797-801, 806-807. (4) Sugitani, Y., Y. Suzuki, and K. Nagashima (1985) Polymorphism of samarskite and its relationship to other structurally related Nb-Ta oxides with the α-PbO_2 structure. Amer. Mineral., 70, 856-866.