

Crystal Data: Tetragonal or monoclinic; typically metamict. *Point Group:* 4/mor2/m. As prismatic or pyramidal crystals, in parallel or fan-shaped groups, to 6 mm; in concretions, as grains, and massive.

Physical Properties: *Cleavage:* {111}, interrupted. *Fracture:* Subconchoidal. *Tenacity:* Brittle. Hardness = 5.5–6.5 D(meas.) = 6.17–6.24 D(calc.) = [6.46] (for YTaO₄). May be radioactive.

Optical Properties: Opaque, thin fragments may be transparent. *Color:* Brownish black or velvety black; gray, yellow, or brown with alteration; colorless to pale olive-brown in thin section. *Streak:* Pale yellow. *Luster:* Metallic, resinous to greasy; weathered surfaces are dull. *Optical Class:* Biaxial (+); metamict material is isotropic. *Pleochroism:* Light to dark brown. *Orientation:* X = b; Y ≈ a; Z ⊥ c ≈ 6°. α = 2.053 β = 2.075 γ = 2.104 2V(meas.) = 80°

Cell Data: *Space Group:* P(ICDD 26-1478), with a = 7.732 c = 11.49 Z = 8, or *Space Group:* P2/a with a = 5.23 b = 5.45 c = 5.13 β = 93.3° Z = [2]

X-ray Powder Pattern: “Siberia”, Russia; after heating for one hour at 900° C. 3.13 (10), 2.933 (9), 1.900 (7), 1.641 (7b), 1.567 (7b), 2.723 (6), 1.216 (6)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Nb ₂ O ₅	2.15	9.50		RE ₂ O ₃	0.94	33.20	
Ta ₂ O ₅	55.51	47.46	66.18	FeO	trace	0.39	
UO ₃	1.18			MnO	0.87	0.21	
TiO ₂	2.20	0.38		MgO		0.12	
ThO ₂	1.02	0.56		CaO	2.18	1.01	
UO ₂		3.65		H ₂ O ⁺		2.68	
Y ₂ O ₃	23.00		33.82	H ₂ O ⁻		0.17	
Er ₂ O ₃	8.38			LOI	3.36		
				Total	100.79	[99.33]	100.00

(1) Cooglegong, Western Australia. (2) “Siberia”, Russia; RE = La 0.8%, Ce 1.3%, Pr 0.7%, Nd 2.4%, Sm 4.9%, Eu+Gd 8.9%, Tb+Y 63.0%, Dy 7.0%, Ho 1.5%, Er 3.6%, Tu 0.5%, Yb+Lu 5.3%; original total given as 99.17%; corresponds to [(Y, RE)_{0.86}Ca_{0.06}U_{0.04}Fe_{0.02}Mg_{0.01}Th_{0.01}]_{Σ=1.00}(Ta_{0.74}Nb_{0.24}Ti_{0.02})_{Σ=1.00}O_{3.99}. (3) YTaO₄.

Polymorphism & Series: Dimorphous with yttrotantalite-(Y); forms a series with fergusonite-(Y).

Occurrence: In granites and albitized, RE-rich pegmatitic veins; a detrital mineral in placers.

Association: Cassiterite, monazite, euxenite, gadolinite (Cooglegong, Western Australia).

Distribution: Found at Cooglegong, Pilbara district, and in the Marble Bar district, Western Australia. In Russia, found at an undisclosed location in Siberia. Occurs at an undisclosed locality in Jiangxi Province, China.

Name: Honors Francis Gloster Forman (1904–1980), government geologist of Western Australia.

Type Material: Western Australian Museum, Perth, Australia, S381.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana’s system of mineralogy, (7th edition), v. I, 757–763. (2) Simpson, E.S. (1951) Minerals of Western Australia. vol. II, 259, 263–264 [yttrotantalite]. (3) Wylie, A.W. (1954) Lanthanum and scandium distribution in Western Australian fergusonite. Amer. Mineral., 39, 667–669. (4) Butler, J.R. and R. Hall (1960) Chemical variations in members of the fergusonite-formanite series. Mineral. Mag., 32, 392–407. (5) Kornetova, V.A. and M.E. Kazakova (1964) Discovery of formanite in the USSR. Doklady Acad. Nauk SSSR, 154, 359–362 (in Russian). (6) Wolten, G.M. (1967) The structure of the M’-phase of YTaO₄, a third fergusonite polymorph. Acta Cryst., 23, 939–944. (7) Shih Nicheng and Peng Zhizhong (1981) Mineralogy of formanite. K’o Hsueh T’ung Pao, 26(10), 616–617 (in Chinese).

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