Foordite $Sn^{2+}(Nb,Ta)_2O_6$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Massive, in an extremely fine-grained intergrowth with other minerals.

Physical Properties: *Cleavage:* {100}, perfect; {011}, poor. Hardness = 6
D(meas.) = 6.734 D(calc.) = 6.664

Optical Properties: Semitransparent. *Color:* Brownish yellow with a greenish tint.
Streak: Yellowish white. *Luster:* Vitreous to adamantine.
Optical Class: Biaxial (+); birefringence > 0.100. n = [2.294] 2V(meas.) = Moderate.

Cell Data: *Space Group:* $C2/c$. a = 17.090–17.101 b = 4.872–4.879 c = 5.556–5.562
β = 90.85°−90.93° Z = 4

X-ray Powder Pattern: Lutsiro, Rwanda; close to thoreaulite.
2.849 (100), 3.100 (50), 3.071 (50), 1.694 (45), 1.681 (45), 3.592 (40), 1.853 (30)

Chemistry:

	(1)	(2)	(3)
Nb_2O_5	40.1	28.7	27.20
Ta_2O_5	28.7	42.7	45.23
SnO_2		0.9	
Sb_2O_3		0.3	
SnO	25.4	27.1	27.57
PbO	6.0	0.5	
Total	100.2	100.2	100.00

(1) Lutsiro, Rwanda; by electron microprobe, total Sn as SnO; corresponding to $(Sn_{0.87}Pb_{0.13})_{\Sigma=1.00}(Nb_{1.40}Ta_{0.60})_{\Sigma=2.00}O_6$. (2) Kubitaka, Congo; by electron microprobe, Sn^{2+}:Sn^{4+} calculated from stoichiometry; corresponding to $(Sn^{2+}_{0.97}Sb_{0.01}Pb_{0.01})_{\Sigma=0.99}(Nb_{1.04}Ta_{0.93}Sn^{4+}_{0.03})_{\Sigma=2.00}O_6$. (3) $Sn(Nb,Ta)_2O_6$ with Nb:Ta = 1:1.

Mineral Group: Forms a series with thoreaulite.

Occurrence: A very rare mineral, in an alluvial pebble originating from a highly differentiated granite pegmatite, formed under reducing conditions deficient in Fe, Mn, Na, Ca, and F (Lutsiro, Rwanda).

Association: Ferrocolumbite, cassiterite, stannoan plumbomicrolite, ixiolite (Lutsiro, Rwanda).

Distribution: From about 15 km north-northwest of Lutsiro, near the Sebeya River, western Rwanda. At Kubitaka, near Punia, Kivu Province, Congo (Zaire).

Name: To honor Dr. Eugene Edward Foord (1946–1998), American mineralogist with the U.S. Geological Survey, Denver, Colorado, USA, student of granite pegmatites.

Type Material: Catholic University of Louvain, Louvain, Belgium, P1284.

References: (1) Černý, P., A.-M. Fransolet, T.S. Ercit, and R. Chapman (1988) Foordite $SnNb_2O_6$, a new mineral species, and the foordite-thoreaulite series. Can. Mineral., 26, 889–898.
(2) Ercit, T.S. and P. Černý (1988) The crystal structure of foordite. Can. Mineral., 26, 899–903.
(3) (1990) Amer. Mineral., 75, 707 (abs. refs. 1 and 2).