Oxy-foitite $\square(Fe^{2+}Al_2)\,Al_6(Si_6O_{18})(BO_3)_3(OH)_3O$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As prismatic crystals to 1 cm, striated ‖ [0001].

Physical Properties: *Cleavage*: None. *Fracture*: Sub-conchoidal. *Tenacity*: Brittle. Hardness = ~7 D(meas.) = n.d. D(calc.) = 3.143

Optical Properties: Translucent to transparent. *Color*: Black. *Streak*: Gray. *Luster*: Vitreous. *Optical Class*: Uniaxial (–). ω = 1.660(5) ε = 1.630(5) *Pleochroism*: *O* = dark brown, *E* = pale brown.

Cell Data: *Space Group*: *R*3*m*. *a* = 15.9387(3) *c* = 7.1507(1) Z = 3

X-ray Powder Pattern: Cooma Complex, New South Wales, Australia.
3.466 (100), 2.579 (98), 2.953 (87), 6.357 (51), 2.041 (50), 3.990 (49), 4.220 (47)

Chemistry:	(1)		(1)
SiO_2	35.67	ZnO	0.09
TiO_2	0.22	CaO	0.06
B_2O_3	[10.52]	Na_2O	1.41
Al_2O_3	36.49	K_2O	0.03
FeO	[8.37]	F	0.07
Fe_2O_3	[1.15]	H_2O	[3.08]
MgO	2.48	$-O = F_2$	0.03
MnO	0.36	Total	99.97

(1) Cooma Complex, New South Wales, Australia; average of 10 electron microprobe analyses supplemented by Fourier transform infrared spectroscopy, H_2O and B_2O_3 calculated from stoichiometry, FeO and Fe_2O_3 calculated from FeO(total) = 9.40 and Mössbauer spectroscopic analysis; corresponds to $^{X}(\square_{0.53}Na_{0.45}Ca_{0.01}K_{0.01})_{\Sigma=1.00}{}^{Y}(Al_{1.53}Fe^{2+}{}_{1.16}Mg_{0.22}Mn^{2+}{}_{0.05}Zn_{0.01}Ti^{4+}{}_{0.03})_{\Sigma=3.00}{}^{Z}(Al_{5.47}Fe^{3+}{}_{0.14}Mg_{0.39})_{\Sigma=6.00}[(Si_{5.89}Al_{0.11})_{\Sigma=6.00}O_{18}](BO_3)_3{}^{V}(OH)_3{}^{W}[O_{0.57}F_{0.04}(OH)_{0.39}]_{\Sigma=1.00}$.

Polymorphism & Series: Related to foitite through the substitution $^{Y}Al^{3+} + {}^{W}O_2 \rightarrow {}^{Y}Fe^{2+} + {}^{W}(OH)^{1-}$.

Mineral Group: Tourmaline supergroup, *X*-site vacant group.

Occurrence: From granitic pegmatite in high-grade migmatitic gneisses of pelitic composition. The oxy-foitite formation is related to the partial melting of these gneisses.

Association: Muscovite, K-feldspar, quartz.

Distribution: From the Cooma metamorphic Complex, New South Wales, Australia.

Name: Honors Franklin F. Foit Jr. (b. 1942), Washington State University, Pullman, Washington, USA, for his work on the tourmaline-supergroup. The prefix indicates OH^- dominance in the *W*-site.

Type Material: Museum of Earth Sciences, Department of Earth Sciences, Sapienza University of Rome, Italy (8829/84).

References: (1) Bosi, F., H. Skogby, and U. Hålenius (2017) Oxy-foitite, $\square(Fe^{2+}Al_2)Al_6(Si_6O_{18})(BO_3)_3(OH)_3O$, a new mineral species of the tourmaline supergroup. Eur. J. Mineral., 29(5), 889-896. (2) (2018) Amer. Mineral., 103, 1713-1714 (abs. ref. 1).