

Oxy-foitite

Crystal Data: Hexagonal. *Point Group:* 3m. 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 (-). $\omega = 1.660(5)$ $\varepsilon = 1.630(5)$ *Pleochroism:* O = dark brown, E = pale brown.

Cell Data: *Space Group:* R3m. $a = 15.9387(3)$ $c = 7.1507(1)$ $Z = 3$

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 ₂ O ₃	[10.52]	Na ₂ O	1.41
Al ₂ O ₃	36.49	K ₂ O	0.03
FeO	[8.37]	F	0.07
Fe ₂ O ₃	[1.15]	H ₂ O	[3.08]
MgO	2.48	<u>-O = F₂</u>	<u>0.03</u>
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, H₂O and B₂O₃ calculated from stoichiometry, FeO and Fe₂O₃ calculated from FeO(total) = 9.40 and Mössbauer spectroscopic analysis; corresponds to $^{\text{X}}(\square_{0.53}\text{Na}_{0.45}\text{Ca}_{0.01}\text{K}_{0.01})_{\Sigma=1.00}^{\text{Y}}(\text{Al}_{1.53}\text{Fe}^{2+}_{1.16}\text{Mg}_{0.22}\text{Mn}^{2+}_{0.05}\text{Zn}_{0.01}\text{Ti}^{4+}_{0.03})_{\Sigma=3.00}^{\text{Z}}(\text{Al}_{5.47}\text{Fe}^{3+}_{0.14}\text{Mg}_{0.39})_{\Sigma=6.00}[(\text{Si}_{5.89}\text{Al}_{0.11})_{\Sigma=6.00}\text{O}_{18}](\text{BO}_3)_3^{\text{V}}(\text{OH})_3^{\text{W}}[\text{O}_{0.57}\text{F}_{0.04}(\text{OH})_{0.39}]_{\Sigma=1.00}$.

Polymorphism & Series: Related to foitite through the substitution $^{\text{Y}}\text{Al}^{3+} + ^{\text{W}}\text{O}_2 \rightarrow ^{\text{Y}}\text{Fe}^{2+} + ^{\text{W}}(\text{OH})^{1-}$.

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, $\square(\text{Fe}^{2+}\text{Al}_2)\text{Al}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{O}$, 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).