

Crystal Data: Hexagonal. *Point Group:* 3m. Prismatic crystals display $\{10\bar{1}0\}$ and $\{11\bar{2}0\}$ with striated faces and are terminated by $\{0001\}$, to 2.3 cm.

Physical Properties: *Cleavage:* [Poor/indistinct on $\{0001\}$.] *Fracture:* Sub-conchoidal.
Tenacity: Brittle. Hardness = 7.5 D(meas.) = n.d. D(calc.) = 3.091-3.123

Optical Properties: Transparent. *Color:* Blue-green. *Streak:* White. *Luster:* Vitreous.
Optical Class: Uniaxial (-). $\omega = 1.648(2)$ $\varepsilon = 1.629(2)$ *Pleochroism:* O = green to bluish green; E = pale green.

Cell Data: *Space Group:* $R\bar{3}m$. $a = 15.8933(2)$ $c = 7.1222(1)$ $Z = 3$

X-ray Powder Pattern: Cruzeiro mine, São José da Safira, Minas Gerais, Brazil.
 2.568 (100), 2.939 (92), 3.447 (67), 3.974 (58), 2.031 (57), 4.200 (49), 1.444 (32)

Chemistry:	(1)		(1)
SiO ₂	37.48	K ₂ O	0.06
Al ₂ O ₃	37.81	F	1.49
FeO	3.39	B ₂ O ₃	10.83
MnO	2.09	Li ₂ O	1.58
ZnO	0.27	H ₂ O	[3.03]
CaO	0.34	-O = F ₂	0.63
Na ₂ O	2.51	Total	100.25

(1) Cruzeiro mine, São José da Safira, Minas Gerais, Brazil; average of 10 electron microprobe analyses supplemented by secondary-ion mass and Mössbauer spectrometry, H₂O calculated from stoichiometry; corresponds to $^X(\text{Na}_{0.78}\square_{0.15}\text{Ca}_{0.06}\text{K}_{0.01})^Y(\text{Al}_{1.15}\text{Li}_{1.02}\text{Fe}^{2+}_{0.46}\text{Mn}^{2+}_{0.28}\text{Zn}_{0.03})^Z\text{Al}_6^T(\text{Si}_{6.02}\text{O}_{18})^B(\text{BO}_3)_3^V(\text{OH})_3^W[\text{F}_{0.76}(\text{OH})_{0.24}]$.

Polymorphism & Series: Solid-solution exists with elbaite and tsilaite.

Mineral Group: Tourmaline supergroup, alkali group, subgroup 2.

Occurrence: Formed in or near miarolitic cavities by late-stage hydrothermal solutions in a zoned granitic pegmatite.

Association: Quartz, muscovite, lepidolite, spodumene, spessartine, beryl.

Distribution: From the Cruzeiro mine, São José da Safira and the Urubu mine, Itinga, Minas Gerais, Brazil.

Name: As an *elbaite* with dominant *fluorine* in the W site.

Type Material: Museum of Mineralogy, Earth Sciences Department, Sapienza University, Rome, Italy (33045) and the Department of Natural History, Royal Ontario Museum, Toronto, Canada (M56418).

References: (1) Bosi, F., G.B. Andreozzi, H. Skogby, A.J. Lussier, Y. Abdu, and F.C. Hawthorne (2013) Fluor-elbaite, $\text{Na}(\text{Li}_{1.5}\text{Al}_{1.5})\text{Al}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3\text{F}$, a new mineral species of the tourmaline supergroup. *Amer. Mineral.*, 98, 297-303.