Tsilaisite $NaMn^{2+}_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3(OH)$

Crystal Data: Hexagonal. *Point Group*: 3*m*. Crystals show elongated {10$\bar{1}$ 0} and {11$\bar{2}$ 0} striated prisms terminated by prominent {0001} and small, minor pyramidal faces.

Physical Properties: *Cleavage*: Imperfect on {10$\bar{1}$ 1} and {11$\bar{2}$ 0}; {0001} parting. *Tenacity*: Brittle. *Fracture*: Subconchoidal. Hardness = ~7 D(calc.) = 3.133 Nonfluorescent.

Optical Properties: Transparent. *Color*: Greenish yellow. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.645(5) ε =1.625(5) *Pleochroism*: *O* = pale greenish yellow, *E* = very pale greenish yellow.

Cell Data: *Space Group*: *R*3*m*. *a* = 15.9461(5) *c* = 7.1380(3) Z = 3

X-Ray Diffraction Pattern: Grotta d'Oggi, San Pietro in Campo, Elba, Italy. 3.974 (100), 2.942 (94), 2.570 (79), 2.034 (49), 4.205 (41), 6.329 (22), 2.377 (21)

Chemistry:

	(1)		(1)
SiO_2	33.10	Na_2O	2.11
TiO_2	0.32	K_2O	0.03
Al_2O_3	37.10	Li_2O	0.81
B_2O_3	10.24	H_2O	3.09
MnO	9.60	F	0.79
CaO	0.09	-O = F	0.33
		Total	99.95

(1) Grotta d'Oggi, San Pietro in Campo, Elba, Italy; average electron microprobe analysis supplemented by secondary ion mass spectrometry, optical absorption and IR spectroscopy, and crystal-structure refinement; corresponds to $^{X}(Na_{0.67}\square_{0.30}Ca_{0.02}K_{0.01})^{Y}(Mn^{2+}_{1.34}Al_{1.14}Li_{0.54}Ti_{0.04})$ $^{Z}Al_6{}^{T}(Si_{5.94}Al_{0.06})B_{2.91}O_{27}{}^{V}(OH)_3{}^{W}([(OH)_{0.39}F_{0.41}O_{0.20}]$.

Mineral Group: Tourmaline supergroup.

Occurrence: In an aplitic dike in an LCT-type pegmatite.

Association: Quartz, K-feldspar, plagioclase, elbaite, schorl. Tsilaisite, fluortsilaisite and fluor-elbaite are closely related and can occur in the same color-zoned tourmaline crystal.

Distribution: From Grotta d'Oggi, San Pietro in Campo, Elba, Italy.

Name: For the *Tsilais*ina mine in the Sahatany Valley, Madagascar, from where the first Mn-rich tourmalines were described.

Type Material: Museo di Scienze della Terra, settore Mineralogico Petrografico "Carlo Lorenzo Garavelli," Campus Universitario, Bari, Italy (sample 12/nm).

References: (1) Bosi F., H. Skogby, G. Agrosì, and E. Scandale (2012) Tsilaisite, $NaMn_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3OH$, a new mineral species of the tourmaline supergroup from Grotta d'Oggi, San Pietro in Campo, island of Elba, Italy. Amer. Mineral., 97, 989-994. (2) Henry, D.J., M. Novák, F.C. Hawthorne, A. Ertl, B.L. Dutrow, P. Uher, and F. Pezzotta (2011) Nomenclature of the tourmaline-supergroup minerals. Amer. Mineral., 96, 895-913. (3) Bosi, F., G.B. Andreozzi, G. Agrosì, and E. Scandale (2015) Fluor-tsilaisite, $NaMn_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3F$, a new tourmaline from San Piero in Campo (Elba, Italy) and new data on tsilaisitic tourmaline from the holotype specimen locality. Mineral. Mag., 79, 89-101.