

**Tsilaisite****NaMn<sup>2+</sup>3Al<sub>6</sub>(Si<sub>6</sub>O<sub>18</sub>)(BO<sub>3</sub>)<sub>3</sub>(OH)<sub>3</sub>(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 (-).  $\omega = 1.645(5)$   $\varepsilon = 1.625(5)$  *Pleochroism:* *O* = pale greenish yellow, *E* = very pale greenish yellow.

**Cell Data:** *Space Group:* R3*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)

<b>Chemistry:</b>	(1)		(1)
SiO <sub>2</sub>	33.10	Na <sub>2</sub> O	2.11
TiO <sub>2</sub>	0.32	K <sub>2</sub> O	0.03
Al <sub>2</sub> O <sub>3</sub>	37.10	Li <sub>2</sub> O	0.81
B <sub>2</sub> O <sub>3</sub>	10.24	H <sub>2</sub> O	3.09
MnO	9.60	F	0.79
CaO	0.09	<u>-O = F</u>	<u>0.33</u>
		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 <sup>X</sup>(Na<sub>0.67</sub>□<sub>0.30</sub>Ca<sub>0.02</sub>K<sub>0.01</sub>)<sup>Y</sup>(Mn<sup>2+</sup><sub>1.34</sub>Al<sub>1.14</sub>Li<sub>0.54</sub>Ti<sub>0.04</sub>)<sup>Z</sup>Al<sub>6</sub>(Si<sub>5.94</sub>Al<sub>0.06</sub>)B<sub>2.91</sub>O<sub>27</sub><sup>F</sup>(OH)<sub>3</sub><sup>W</sup>[(OH)<sub>0.39</sub>F<sub>0.41</sub>O<sub>0.20</sub>].

**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 *Tsilaisina* 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. Agrosi, and E. Scandale (2012) Tsilaisite, NaMn<sub>3</sub>Al<sub>6</sub>(Si<sub>6</sub>O<sub>18</sub>)(BO<sub>3</sub>)<sub>3</sub>(OH)<sub>3</sub>OH, 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. Agrosi, and E. Scandale (2015) Fluor-tsilaisite, NaMn<sub>3</sub>Al<sub>6</sub>(Si<sub>6</sub>O<sub>18</sub>)(BO<sub>3</sub>)<sub>3</sub>(OH)<sub>3</sub>F, 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.