Tsilaisite  \[\text{NaMn}^{2+3}\text{Al}_6(\text{Si}_6\text{O}_{18})(\text{BO}_3)_3(\text{OH})_3(\text{OH})\]

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

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

Optical Properties: Transparent.  \(\text{Color}: \text{Greenish yellow}.\)  \(\text{Streak}: \text{White}.\)  \(\text{Luster}: \text{Vitreous}.\)  \(\text{Optical Class}: \text{Uniaxial} (-).\) \(\omega = 1.645(5)\) \(\epsilon = 1.625(5)\)  \(\text{Pleochroism}: O = \text{pale greenish yellow},\)  \(E = \text{very pale greenish yellow}.\)

Cell Data:  \(\text{Space Group}: R\overline{3}m.\) \(a = 15.9461(5)\) \(c = 7.1380(3)\)  \(Z = 3\)

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

Chemistry:

| \(\text{Si}_2\text{O}_2\) | 33.10 | \(\text{Na}_2\text{O}\) | 2.11 |
| \(\text{Ti}_2\text{O}_2\) | 0.32 | \(\text{K}_2\text{O}\) | 0.03 |
| \(\text{Al}_2\text{O}_3\) | 37.10 | \(\text{Li}_2\text{O}\) | 0.81 |
| \(\text{B}_2\text{O}_3\) | 10.24 | \(\text{H}_2\text{O}\) | 3.09 |
| \(\text{MnO}\) | 9.60 | \(\text{F}\) | 0.79 |
| \(\text{CaO}\) | 0.09 | \(-\text{O} = \text{F}\) | 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 \(\text{Na}_{0.67}\text{Li}_{0.30}\text{Ca}_{0.02}\text{K}_{0.01}\) \(\text{Mn}_{1.34}\text{Al}_{1.14}\text{Li}_{0.54}\text{Ti}_{0.04}\) \(\text{Al}_6(\text{Si}_{15.94}\text{Al}_{0.06})\text{B}_{2.91}\text{O}_{37}(\text{OH})_3\) \(\text{[(OH)}_{8.39}\text{F}_{0.41}\text{O}_{0.20}\).

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 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/\(\text{nm}\)).