

Masutomilite **$K(\text{Li, Al, Mn}^{2+})_3(\text{Si, Al})_4\text{O}_{10}(\text{F, OH})_2$**

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Crystal Data: Monoclinic. *Point Group:* 2. As the core of a sharply zoned 10 cm mica crystal; as isolated flakes in a coating on garnet.

Physical Properties: *Cleavage:* {001}, perfect. Hardness = 2.5 D(meas.) = 2.90–2.94 D(calc.) = 2.96

Optical Properties: Transparent to translucent. *Color:* Pale purple-pink, purple; colorless to pink or purple in thin section.

Optical Class: Biaxial (-). *Pleochroism:* X = Z = colorless, pale pink, pale purple; Y = purple. *Orientation:* Y = b; Z \wedge a = 2°–4°. *Dispersion:* r > v, very weak. *Absorption:* Y > Z > X. $\alpha = 1.534\text{--}1.536$ $\beta = 1.569\text{--}1.570$ $\gamma = 1.570\text{--}1.574$ 2V(meas.) = 28°–35°

Cell Data: *Space Group:* C2. a = 5.262(2) b = 9.102(3) c = 10.094(3) $\beta = 100.83(2)^\circ$ Z = [2]

X-ray Powder Pattern: Tanakamiyama, Japan.

3.32 (100), 10.10 (70), 3.35 (65), 3.09 (60), 3.64 (45), 2.589 (45), 1.989 (45)

Chemistry:

	(1)		(1)
SiO ₂	46.85	Li ₂ O	4.45
TiO ₂	0.13	Na ₂ O	0.54
Al ₂ O ₃	19.81	K ₂ O	9.88
Fe ₂ O ₃	0.38	Rb ₂ O	1.54
FeO	1.53	F	7.04
MnO	8.12	H ₂ O ⁺	1.27
MgO	0.00	H ₂ O ⁻	1.36
CaO	0.00	<u>-O = F₂</u>	<u>2.96</u>
		Total	99.94

(1) Tanakamiyama, Japan; corresponding to $(\text{K}_{0.89}\text{Na}_{0.07}\text{Rb}_{0.07})_{\Sigma=1.03}(\text{Li}_{1.27}\text{Al}_{0.98}\text{Mn}_{0.49}^{2+}\text{Fe}_{0.09}^{2+}\text{Fe}_{0.03}^{3+})_{\Sigma=2.86}(\text{Si}_{3.32}\text{Al}_{0.68})_{\Sigma=4.00}\text{O}_{9.82}[\text{F}_{1.58}(\text{OH})_{0.60}]_{\Sigma=2.18}$.

Polymorphism & Series: 1M, 2M₁ polytypes.

Mineral Group: Mica group.

Occurrence: In a druse in a granite pegmatite, as the core of a crystal zoned with manganoan zinnwaldite (Tanakamiyama, Japan); as reaction rims coating spessartine-rich garnets in manganese-rich parts of a lithium pegmatite (Ctidružice, Czech Republic).

Association: Zinnwaldite, topaz, tourmaline, albite, quartz, cassiterite (Tanakamiyama, Japan); manganoan garnet, manganoan elbaite (Ctidružice, Czech Republic).

Distribution: From Tanakamiyama, Otsu, Shiga Prefecture, and Tawara, Gifu Prefecture, Japan. At Washington Pass, Okanogan Co., Washington, USA. From Ctidružice, Czech Republic.

Name: For Dr. Kazunosuke Masutomi, Japanese amateur mineralogist.

Type Material: Kanazawa University, Kanazawa; Tohoku University, Kawauchi, Japan.

References: (1) Harada, K., M. Honda, K. Nagashima, and S. Kanisawa (1977) Masutomilite, manganese analog of zinnwaldite, with special reference to masutomilite-lepidolite-zinnwaldite series. Mineral. J. (Japan), 8, 95–109. (2) (1977) Amer. Mineral., 62, 594 (abs. ref. 1). (3) Němec, J. (1983) Masutomilite in lithium pegmatites of West-Moravia, Czechoslovakia. Neues Jahrb. Mineral., Monatsh., 537–540. (4) Mizota, T., T. Kato, and K. Harada (1986) The crystal structure of masutomilite, Mn analog of zinnwaldite. Mineral. J. (Japan), 13, 13–21.

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