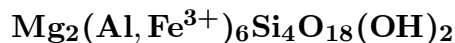


Yoderite



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Crystal Data: Monoclinic. *Point Group:* $2/m$. As anhedral grains, bladed or lathlike || [010], to 12 mm.

Physical Properties: *Cleavage:* Partings [001], good and {100}, poor. Hardness = 6
D(meas.) = 3.39 D(calc.) = [3.33]

Optical Properties: Transparent. *Color:* Deep purple, emerald-green; in transmitted light, deep blue to olive-green, green to yellow. *Luster:* Vitreous.

Optical Class: Biaxial (+). *Pleochroism:* Strong; X = pale Prussian blue, green; Y = indigo, light yellow; Z = pale olive-green, yellow. *Orientation:* $Y = b$; $X \wedge a \simeq 9^\circ$; $Z \wedge c \simeq 7^\circ$. *Absorption:* $Y > X > Z$. $\alpha = 1.689\text{--}1.691$ $\beta = 1.691\text{--}1.693$ $\gamma = 1.712\text{--}1.715$
 $2V(\text{meas.}) = 25^\circ\text{--}30^\circ$

Cell Data: *Space Group:* $P2_1/m$. $a = 8.022(2)$ $b = 5.816(1)$ $c = 7.250(2)$
 $\beta = 104.9(1)^\circ$ $Z = [1]$

X-ray Powder Pattern: Mautia Hill, Tanzania.

3.50 (100), 3.03 (80), 2.61 (60), 2.00 (60), 1.82 (60), 3.23 (50), 3.19 (50)

Chemistry:

	(1)	(2)
SiO ₂	35.94	36.07
TiO ₂	0.11	0.07
Al ₂ O ₃	42.95	42.76
Fe ₂ O ₃	5.16	4.08
Mn ₂ O ₃	0.62	0.85
FeO	0.24	0.19
MnO	0.23	0.13
MgO	12.05	11.83
H ₂ O ⁺	2.69	[2.69]
P ₂ O ₅		0.36
Total	[99.99]	[99.03]

(1) Mautia Hill, Tanzania; Fe²⁺:Fe³⁺ from Mössbauer spectroscopy. (2) Do.; by electron microprobe, Fe²⁺:Fe³⁺ from Mössbauer spectroscopy, H₂O from (1); corresponds to (Mg_{1.95}Fe_{0.02}²⁺Mn_{0.01}²⁺)_{Σ=1.98}(Al_{5.57}Fe_{0.34}³⁺Mn_{0.07}³⁺Ti_{0.01})_{Σ=5.99}(Si_{3.98}P_{0.03})_{Σ=4.01}O_{18.02}(OH)_{1.98}.

Occurrence: A major phase in quartz-kyanite-talc schist formed under conditions of ~10 kbar H₂O pressure and 800 °C.

Association: Kyanite, talc, hematite, quartz.

Distribution: On Mautia Hill, Kongwa, Central Province, Tanzania.

Name: For Hatten Schuyler Yoder, Jr. (1921–), petrologist with the Geophysical Laboratory, Washington, D.C., USA.

Type Material: Geological Survey of Tanzania, JH 2563/2, JH 2563/14; National Museum of Natural History, Washington, D.C., USA, 137854.

References: (1) McKie, D. (1959) Yoderite, a new hydrous magnesium iron alumino-silicate from Mautia Hill, Tanganyika. *Mineral. Mag.*, 32, 282–307. (2) (1960) *Amer. Mineral.*, 45, 753 (abs. ref. 1). (3) Abu-Eid, R.M., K. Langer, and F. Seifert (1978) Optical absorption and Mössbauer spectra of purple and green yoderite, a kyanite-related mineral. *Phys. Chem. Minerals*, 3, 271–289. (4) Higgins, J.B., P.H. Ribbe, and Y. Nakajima (1982) An ordering model for the commensurate antiphase structure of yoderite. *Amer. Mineral.*, 67, 76–84. (5) Fockenberg, T. and W. Schreyer (1991) Yoderite, a mineral with essential ferric iron: its lack of occurrence in the system MgO–Al₂O₃–SiO₂–H₂O. *Amer. Mineral.*, 76, 1052–1060.

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