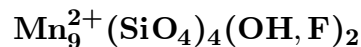


Sonolite

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals prismatic to anhedral, to 2.5 cm; granular. *Twinning:* Singular or lamellar on $\{101\}$, common.**Physical Properties:** Hardness = 5.5 D(meas.) = 3.82–4.00 D(calc.) = 3.97**Optical Properties:** Transparent. *Color:* Brown, dark brown, reddish brown to reddish orange; colorless in thin section. *Luster:* Dull to vitreous.*Optical Class:* Biaxial (-). *Orientation:* $X \wedge \{001\} = 9^\circ\text{--}10^\circ$. *Dispersion:* $r > v$. $\alpha = 1.763$
 $\beta = 1.779$ $\gamma = 1.793$ $2V(\text{meas.}) = 75.5^\circ\text{--}82^\circ$ **Cell Data:** *Space Group:* $P2_1/b$. $a = 4.872(5)$ $b = 10.669(12)$ $c = 14.287(7)$
 $\alpha = 100.30(10)^\circ$ $Z = 2$ **X-ray Powder Pattern:** Franklin, New Jersey, USA.

2.869 (10), 1.743 (10), 2.651 (7), 2.608 (7), 2.699 (5.5), 2.458 (5), 2.504 (4.5)

Chemistry:

	(1)
SiO ₂	22.37
TiO ₂	0.09
Al ₂ O ₃	2.56
FeO	0.93
MnO	62.01
MgO	3.45
CaO	0.73
F	0.21
H ₂ O ⁺	3.08
H ₂ O ⁻	0.30
CO ₂	4.53
-O = F ₂	0.09
Total	100.17

(1) Hanawa mine, Japan; corresponds to $(\text{Mn}_{7.80}\text{Mg}_{1.05}\text{Fe}_{0.16}\text{Ca}_{0.16})_{\Sigma=9.17}$
 $(\text{Si}_{3.45}\text{Al}_{0.62}\text{Ti}_{0.01})_{\Sigma=4.08}\text{O}_{15.91}[(\text{OH})_{1.95}\text{F}_{0.14}]_{\Sigma=2.09}$.**Polymorphism & Series:** Dimorphous with jerrygibbsite.**Mineral Group:** Humite group.**Occurrence:** In metamorphosed manganese-rich deposits.**Association:** Rhodochrosite, galaxite, pyrochroite (Japan); franklinite, willemite, zincite, manganosite, chlorite, calcite, tephroite (Franklin, New Jersey, USA).**Distribution:** In the Sono mine, Kyoto Prefecture; the Hanawa mine, Iwate Prefecture; the Hokkejino mine, Kyoto Prefecture; the Kuratomi mine, Oita Prefecture; and a number of other places in Japan. In the USA, at Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey, and at Bald Knob, near Sparta, Alleghany Co., North Carolina. From Bonneval-sur-Arc, Savoie, France. In Kyrgyzstan, on Inyl'chek Ridge, Tien Shan.**Name:** For the Sono mine, Japan, where it was originally found.**Type Material:** Harvard University, Cambridge, Massachusetts, USA, 114576.**References:** (1) Yoshinaga, M. (1963) Sonolite, a new manganese silicate mineral. Mem. Fac. Sci. Kyushu Univ., Ser. D, Geol., 14, 1–21. (2) (1963) Amer. Mineral., 48, 1413 (abs. ref. 1). (3) Cook, D. (1969) Sonolite, alleghanyite and leucophoenicite from New Jersey. Amer. Mineral., 54, 1392–1398. (4) Ribbe, R.H. and G.V. Gibbs (1971) Crystal structures of the humite minerals: III. Mg/Fe ordering in humite and its relation to other ferromagnesian silicates. Amer. Mineral., 56, 1155–1173. (5) Kato, T., Y. Ito, and N. Hashimoto (1989) The crystal structures of sonolite and jerrygibbsite. Neues Jahrb. Mineral., Monatsh., 410–430.

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