

Sugilite

 $\text{KNa}_2(\text{Fe}^{3+}, \text{Mn}^{3+}, \text{Al})_2\text{Li}_3\text{Si}_{12}\text{O}_{30}$

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Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Crystals prismatic, to 2 cm, rare. Commonly in interlocking aggregates of subhedral grains, compact to massive.

Physical Properties: *Cleavage:* {0001}, poor. Hardness = 5.5–6.5 $D(\text{meas.}) = 2.74\text{--}2.79$ $D(\text{calc.}) = 2.80$

Optical Properties: Transparent to translucent. *Color:* Light brownish yellow to bright magenta; nearly colorless in thin section. *Streak:* White. *Luster:* Vitreous.

Optical Class: Uniaxial (-). *Pleochroism:* Weak. $\omega = 1.595\text{--}1.611$ $\epsilon = 1.590\text{--}1.607$

Cell Data: *Space Group:* $P6/mcc$. $a = 10.007$ $c = 14.000$ $Z = 2$

X-ray Powder Pattern: Iwagi Islet, Japan; similar to sogdianite. 4.32 (100), 3.19 (80), 4.06 (55), 2.876 (50b), 3.50 (25), 2.499 (18), 6.98 (13)

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	71.38	72.38	CaO	0.00
TiO ₂	0.51	0.00	Li ₂ O	3.14 [4.5]
Al ₂ O ₃	2.97	5.88	Na ₂ O	4.37 5.65
Fe ₂ O ₃	12.76	5.62	K ₂ O	3.76 4.71
Mn ₂ O ₃		0.89	H ₂ O ⁺	0.81
FeO	0.19		H ₂ O ⁻	0.12
			Total	[100.01] [99.63]

(1) Iwagi Islet, Japan; by XRF and spectrographic methods, recalculated after deduction of admixed pectolite; corresponds to $(\text{K}_{0.81}\text{Na}_{0.19})_{\Sigma=1.00}[(\text{H}_2\text{O})_{0.91}\text{Na}_{0.64}]_{\Sigma=1.55}(\text{Fe}_{1.32}^{3+}\text{Na}_{0.59}\text{Ti}_{0.06}\text{Fe}_{0.03}^{2+})_{\Sigma=2.00}(\text{Li}_{2.12}\text{Al}_{0.59}\text{Fe}_{0.29}^{3+})_{\Sigma=3.00}\text{Si}_{12}\text{O}_{30}$. (2) Wessels mine, South Africa; by electron microprobe, Li₂O from stoichiometry; corresponding to $\text{K}_{1.00}\text{Na}_{1.82}(\text{Al}_{1.16}\text{Fe}_{0.70}^{3+}\text{Mn}_{0.12}^{3+})_{\Sigma=1.98}\text{Li}_{3.02}\text{Si}_{12}\text{O}_{30}$.

Mineral Group: Milarite group.

Occurrence: In an aegirine-bearing syenite stock in biotite granite (Iwagi Islet, Japan); in bedded manganese deposits (near Kuruman, South Africa).

Association: Albite, aegirine, pectolite, titanite, allanite, andradite, zircon, apatite (Iwagi Islet, Japan).

Distribution: On Iwagi Islet, Ehime Prefecture, Japan. In the Wessels and N'Chwaning mines, near Kuruman, Cape Province, South Africa. At Mont Saint-Hilaire, Quebec, Canada. In the Cerchiara mine, near Faggiona, Liguria, Italy. From an undetermined locality in Madhya Pradesh, India. In the Woods mine, 30 km north-northeast of Tamworth, New South Wales, Australia.

Name: For Professor Ken-ichi Sugi (1901–1948), Japanese petrologist, who discovered the mineral.

Type Material: Yamaguchi University, Yamaguchi; Sakurai Museum, Tokyo; National Science Museum, Tokyo, Japan; The Natural History Museum, London, England, 1975,342; National Museum of Natural History, Washington, D.C., USA, 133982.

References: (1) Murakami, N., T. Kato, Y. Miura, and F. Hirowatari (1977) Sugilite, a new silicate mineral from Iwagi Islet, southwest Japan. *Mineral. J. (Japan)*, 8, 110–121. (2) (1977) *Amer. Mineral.*, 62, 596 (abs. ref. 1). (3) Dunn, P.J., J.J. Brummer, and H. Belsky (1980) Sugilite, a second occurrence: Wessels mine, Kalahari manganese field, Republic of South Africa. *Can. Mineral.*, 18, 37–39. (4) Clark, A.M., E.E. Fejer, A.G. Couper, G.S. Bearne, and V.K. Din (1980) Additional data on sugilite. *Mineral. Mag.*, 43, 947–949. (5) Armbruster, T. and R. Oberhänsli (1988) Crystal chemistry of double-ring silicates: structures of sugilite and brannockite. *Amer. Mineral.*, 73, 595–600.

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