

Osumilite



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Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Crystals tabular to prismatic, elongated \parallel [0001], to 5 mm. Also anhedral and massive. *Twining:* Rarely, \perp {0001}.

Physical Properties: *Cleavage:* Indistinct, \parallel and \perp {0001}. *Tenacity:* Brittle. Hardness = n.d. $D(\text{meas.}) = 2.58\text{--}2.68$ $D(\text{calc.}) = 2.71$

Optical Properties: Translucent. *Color:* Black, dark blue, dark brown, pink, gray; light blue or light pink in thin section. *Luster:* Vitreous.

Optical Class: Uniaxial (+) or (-); anomalously biaxial. *Pleochroism:* O = light blue to bluish purple, pale pink, pale yellow-brown; E = colorless to brown. $\omega = 1.539\text{--}1.547$ $\epsilon = 1.545\text{--}1.551$ $2V(\text{meas.}) = 28^\circ\text{--}45^\circ$

Cell Data: *Space Group:* $P6/mcc$. $a = 10.08\text{--}10.17$ $c = 14.26\text{--}14.35$ $Z = 2$

X-ray Powder Pattern: Sakkabira, Japan; nearly identical to merrihueite. 3.24 (vs), 7.17 (s), 5.08 (s), 2.930 (s), 4.41 (m), 3.74 (m), 2.776 (m)

Chemistry:

	(1)	(2)
SiO ₂	60.51	59.45
TiO ₂	0.04	0.06
Al ₂ O ₃	21.60	24.56
FeO	9.27	12.85
MnO	0.99	0.52
MgO	3.05	0.41
CaO	0.00	0.00
BaO	0.04	0.01
Na ₂ O	0.67	0.10
K ₂ O	3.46	1.59
Total	99.63	99.55

(1) Sakkabira, Japan; by electron microprobe, corresponds to $(K_{0.76}Na_{0.22})_{\Sigma=0.98}(Fe_{1.33}^{2+}Mg_{0.65})_{\Sigma=1.98}(Al_{2.72}Mg_{0.13}Mn_{0.14}Ti_{0.01})_{\Sigma=3.00}(Si_{10.36}Al_{1.64})_{\Sigma=12.00}O_{30} \cdot 1.03H_2O$.

(2) Bellerberg volcano, Germany; by electron microprobe, corresponds to $(K_{0.35}Na_{0.03})_{\Sigma=0.38}(Fe_{1.84}^{2+}Mg_{0.11})_{\Sigma=1.95}(Al_{3.13}Mn_{0.08}Ti_{0.01})_{\Sigma=3.22}(Si_{10.17}Al_{1.83})_{\Sigma=12.00}O_{30}$.

Mineral Group: Milarite group.

Occurrence: In cavities and the groundmass of rhyolite and dacite, and in high-grade contact metamorphic rocks and xenoliths.

Association: Tridymite, cristobalite, quartz, oligoclase, potassic feldspar, fayalite, "hypersthene," biotite, magnetite, zircon.

Distribution: Localities for which $Fe^{2+}:Mg$ has been established to be of this species include: in Japan, from Sakkabira and Hayato, Kagoshima Prefecture, and from the Asama volcano, northwest of Tokyo, Yamanashi Prefecture. In the USA, at Obsidian Cliffs, Lane Co., Oregon. In the Funtanifigu quarry, Monte Arci, near Oristano, Sardinia, Italy. From the Bellerberg and Nickenicher Sattel volcanos, Eifel district, Germany.

Name: After Osumi Province, an old province in Sakkabira, on Kyushu, Japan.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 104744.

References: (1) Deer, W.A., R.A. Howie, and J. Zussman (1986) Rock-forming minerals, (2nd edition), v. 1B, disilicates and ring silicates, 541–558. (2) Miyashiro, A. (1956) Osumilite, a new silicate mineral, and its crystal structure. *Amer. Mineral.*, 41, 104–116. (3) Armbruster, T. and R. Oberhänsli (1988) Crystal chemistry of double-ring silicates: structural, chemical, and optical variation in osumilites. *Amer. Mineral.*, 73, 585–594.

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