

Crystal Data: Cubic. *Point Group:* 23. Crystals are cubes, up to 5 mm; fine-grained granular to massive.

Physical Properties: *Tenacity:* Waxy in part. Hardness = Soft. VHN = 345–386 (50 g load). D(meas.) = 9.16 D(calc.) = 9.18

Optical Properties: Translucent. *Color:* Olive-green, gray-green, yellow-green, yellow, reddish brown; in transmitted light, deep golden brown to yellow. *Streak:* Light yellowish to brownish white. *Luster:* Adamantine.

Optical Class: Isotropic. $n = > 2.50$

Cell Data: *Space Group:* I23. $a = 10.110(2)$ $Z = 2$

X-ray Powder Pattern: Durango, Mexico.

3.216 (10), 1.743 (9), 2.730 (8), 2.939 (7), 1.651 (6), 1.499 (6), 1.216 (5)

Chemistry:

	(1)	(2)
SiO ₂	2.22	1.85
Bi ₂ O ₃	97.74	96.48
Total	99.96	98.33

(1) Fuka, Japan; corresponds to Bi_{11.93}Si_{1.05}O₂₀. (2) Do.; by electron microprobe, corresponds to Bi_{12.13}Si_{0.90}O₂₀.

Occurrence: A secondary mineral formed by the oxidation of bismuth-bearing minerals (Durango, Mexico); in a hydrothermal vein in skarns (Fuka, Japan).

Association: Bismutite (Durango, Mexico); shattuckite, ajoite, duhamelite (Munihuaza, Mexico); calcite (Fuka, Japan).

Distribution: In Mexico, from an unspecified locality in Durango, and at Munihuaza, near Alamos, Sonora. In the Monapo pegmatite, Mocambique district, Mozambique. From Fujikawachi, Oita Prefecture; Fuka, near Bicchu, Okayama Prefecture; and Ishikawa, Fukushima Prefecture, Japan. In the Czech Republic, from near Smrkovec, Slavkovský Les Mountains, about 10 km north-northeast of Mariánské Lázně.

Name: In honor of Dr. Lars Gunnar Sillén (1916–), Swedish chemist of Stockholm, Sweden.

Type Material: Harvard University, Cambridge, Massachusetts, 83256; National Museum of Natural History, Washington, D.C., USA, C1926.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 601. (2) Aurivillius, B. and L.G. Sillén (1945) Polymorphy of bismuth trioxide. *Nature*, 155, 305–306. (3) Kusachi, I. and C. Henmi (1991) Sillenite from Fuka, Okayama Prefecture, Japan. *Mineral. J. (Japan)*, 15, 343–348. (4) Radaev, S.F., V.I. Simonov, and Y.F. Kargin (1992) Structural features of γ -phase Bi₂O₃ and its place in the sillenite family. *Acta Cryst.*, 48, 604–609.