

Simpsonite

Al₄(Ta, Nb)₃O₁₃(OH)

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Crystal Data: Hexagonal. *Point Group:* 3. Euhedral to subhedral crystals, tabular to short prismatic, with {10 $\bar{1}$ 0} and {0001}, and rarely a few other forms, striated || [0001], to 2.4 cm; commonly in subparallel groups.

Physical Properties: *Fracture:* Conchoidal. Hardness = 7.5 D(meas.) = 6.68–6.82 D(calc.) = [6.82–6.86] Blue-white cathodoluminescence and fluorescence in SW UV, rarely fluoresces yellow.

Optical Properties: Semitransparent. *Color:* White to cream, yellow to yellow-brown when altered; colorless in transmitted light. *Streak:* White. *Luster:* Adamantine.

Optical Class: Uniaxial (-). $\omega = 2.045(5)$ $\epsilon = 2.025(5)$

Cell Data: *Space Group:* P3. $a = 7.385\text{--}7.387$ $c = 4.515\text{--}4.516$ $Z = 1$

X-ray Powder Pattern: Alto do Giz pegmatite, Brazil.

1.651 (100), 2.859 (67), 3.69 (62), 2.131 (59), 1.395 (54), 2.417 (40), 2.609 (37)

Chemistry:

	(1)	(2)	(3)
Nb ₂ O ₅	1.82	0.0	8.6
Ta ₂ O ₅	71.54	76.4	64.6
SiO ₂	1.00		
TiO ₂	0.02	0.0	0.0
SnO ₂	0.10	0.0	0.9
Al ₂ O ₃	25.20	22.8	24.3
FeO	0.16		
CaO	0.12		
H ₂ O		1.0	1.1
Total	99.96	100.2	99.5

(1) Alto do Giz pegmatite, Brazil. (2) Do.; by electron microprobe, H₂O calculated for O:OH = 13:1; corresponding to Al_{3.93}Ta_{3.04}O₁₃(OH). (3) Mumba, Congo; by electron microprobe, H₂O calculated for O:OH = 13:1, corresponding to Al_{3.97}Sn_{0.05}(Ta_{2.44}Nb_{0.54}) $_{\Sigma=2.98}$ O₁₃(OH).

Occurrence: An uncommon accessory mineral in some tantalum-rich granite pegmatites.

Association: Tantalite, manganotantalite, microlite, tapiolite, beryl, spodumene, montebrazite, pollucite, petalite, eucryptite, tourmaline, muscovite, quartz.

Distribution: From Tabba Tabba, Western Australia. At the Alto do Giz pegmatite, near Parelhas, and the Onça mine, about 25 km distant, Rio Grande do Norte, Brazil. In the Al Hayat and Mdara mines, Bikita, and at the Benson No. 3 pegmatite, Mtoko, Zimbabwe. In Congo (Zaire), from Mumba, near Lake Kivu, Kivu Province, and in the Manono pegmatite, Katanga (Shaba) Province. At the Leshaiia pegmatite, Vuoriyarvi carbonatite complex, Kola Peninsula, Russia. In Canada, from the Tanco pegmatite, Bernic Lake, Manitoba.

Name: To honor Dr. Edward Sydney Simpson (1875–1939), Western Australian government mineralogist and mineral analyst.

Type Material: Western Australian Museum, Perth, MDC1006, MDC1007; The Natural History Museum, London, England, 1938,122.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 771. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 446–449. (3) Pough, F.H. (1945) Simpsonite and the northern Brazilian pegmatite region. Bull. Geol. Soc. Amer., 56, 505–514. (4) Kerr, P.F. and R.J. Holmes (1945) X-ray study of the tantalum mineral simpsonite. Bull. Geol. Soc. Amer., 56, 479–504. (5) Ercit, T.S., P. Černý, and F.C. Hawthorne (1992) The crystal chemistry of simpsonite. Can. Mineral., 30, 663–671.

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