Titanoholtite $(Ti_{0.75}\square_{0.25})Al_6BSi_3O_{18}$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As zones to10 μm in holtite.

Physical Properties: *Cleavage*: n.d. *Fracture*: n.d. *Tenacity*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 3.66

Optical Properties: n.d. *Color*: n.d. *Streak*: n.d. *Luster*: n.d.
Optical Class: n.d.

Cell Data: *Space Group*: *Pnma*. [By analogy to dumortierite.] $a = \sim 4.7001$ $b = \sim 11.828$
$c = \sim 20.243$ $Z = 4$

X-ray Powder Pattern: Calculated pattern.
3.2305 (100), 5.8610 (78), 2.8945 (65), 3.4582 (63), 2.9305 (59), 3.0675 (53), 5.9140 (47)

Chemistry:

	(1)
P_2O_5	0.01
Nb_2O_5	0.64
Ta_2O_5	1.07
SiO_2	21.92
TiO_2	4.08
B_2O_3	4.64
Al_2O_3	50.13
As_2O_3	2.22
Sb_2O_3	11.47
FeO	0.16
Total	96.34

(1) Marta mine, Szklana Hill, Lower Silesia, Poland; average electron microprobe analysis; corresponds to $\{(Ti_{0.32}Nb_{0.03}Ta_{0.03}\square_{0.10})(Al_{0.35}Ti_{0.01}Fe_{0.01})\square_{0.15}\}_{\Sigma=1.00}Al_6B_{0.86}\{Si_{2.36}(Sb_{0.51}As_{0.14})\}_{\Sigma=3.01}(O_{17.35}\square_{0.65})_{\Sigma=18.00}$.

Mineral Group: Holtite group, dumortierite supergroup.

Occurrence: In the internal portion of a complex zoned granitic pegmatite.

Association: Holtite, microcline, quartz, muscovite, spessartine, chrysoberyl, zircon, monazite-(Ce), cheralite, xenotime-(Y), Mn-rich fluor-, hydroxyl- and chlorapatite, beusite, columbite-(Fe), columbite-(Mn), tantalite-(Mn), stibiocolumbite, stibiotantalite, fersmite, pyrochlore-supergroup minerals, and other minerals.

Distribution: From the Marta mine, northern part of Szklana Hill, Szklary serpentinite massif, ~60 km south of Wroclaw, Lower Silesia, Poland.

Name: For composition and the relationship to *holtite*.

Type Material: Mineralogical Museum, University of Wrocław, Faculty of Earth Science and Environmental Management, Institute of Geological Sciences, Poland (MMWr IV7617). Also at the National Museum of Natural History (Smithsonian Institution), Washington, D.C., USA (NMNH 175986-175988).

References: (1) Pieczka, A., R.J. Evans, E.S. Grew, L.A. Groat, C. Ma, and G.R. Rossman (2013) The dumortierite supergroup. II. Three new minerals from the Szklary pegmatite, SW Poland: Nioboholtite, $(Nb_{0.6}\square_{0.4})Al_6BSi_3O_{18}$, titanoholtite, $(Ti_{0.75}\square_{0.25})Al_6BSi_3O_{18}$, and szklaryite, $\square Al_6BAs^{3+}{}_3O_{15}$. Mineral. Mag., 77(6), 2841-2856. (2) (2015) Amer. Mineral., 100, 2012-2013 (abs. ref. 1).