

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. In blocky crystals, to 2 cm; as pseudo-hexagonal needles, elongated along [100], typically S-shaped; finely crystalline. *Twinning:* Multiple on {011}.

Physical Properties: *Cleavage:* Good on {001}, may be parting. Hardness = 8.5 $D(\text{calc.}) = [3.92]$ $D(\text{meas.}) = 3.60\text{-}3.90$ Fluoresces dull orange under SW UV and bright yellow under LW UV.

Optical Properties: Semitransparent. *Color:* Light buff to cream-buff or deep olive-buff, brown, russet. *Streak:* Light buff. *Luster:* Resinous, vitreous, dull when weathered. *Optical Class:* Biaxial (-). *Pleochroism:* Various shades of yellow to colorless. *Orientation:* $X = a$. *Dispersion:* $r < v$. $\alpha = 1.705\text{-}1.746$ $\beta = 1.728\text{-}1.759$ $\gamma = 1.730\text{-}1.761$ $2V(\text{meas.}) = 20^\circ\text{-}55^\circ$

Cell Data: *Space Group:* $Pnma$. $a = 4.6914(5)$ $b = 11.896(2)$ $c = 20.383(4)$ $Z = 4$

X-ray Powder Pattern: Greenbushes, Western Australia.

10.28 (100), 2.94 (40), 5.89 (34), 5.93 (32), 5.08 (32), 2.338 (26), 5.12 (24)

Chemistry:	(1)	(2)	(1)	(2)	
SiO ₂	20.30	26.74	BeO	0.05	
TiO ₂	0.09		MgO	0.10	
B ₂ O ₃	1.82	4.67	CaO	0.10	
Al ₂ O ₃	46.43	43.44	Li ₂ O	0.59	
Fe ₂ O ₃	0.27	0.20	Na ₂ O	0.35	
Sb ₂ O ₃	13.89		K ₂ O	0.45	
Sb ₂ O ₅	4.61	6.49	Rb ₂ O	0.11	
As ₂ O ₅		2.92	Cs ₂ O	0.57	
Nb ₂ O ₅	0.76	0.15	H ₂ O ⁺	0.38	1.13
Ta ₂ O ₅	11.24	11.70	H ₂ O ⁻	0.08	
MnO	0.05		Total	99.97	99.71

(1) Greenbushes, Western Australia; B₂O₃ thought to be low; corresponding to $\text{Al}_{24.50}\text{Ta}_{1.36}\text{Nb}_{0.16}\text{Fe}^{3+}_{0.10}\text{Be}_{0.05}\text{Ti}_{0.03}\text{Mn}_{0.02}\text{B}_{1.40}\text{Si}_{9.09}\text{Sb}^{3+}_{2.56}\text{Sb}^{5+}_{0.76}\text{O}_{66.62}(\text{OH})_{1.13}$. (2) Kola Peninsula, Russia; corresponding to $\text{Al}_{23.23}\text{Ta}_{1.49}\text{Nb}_{0.03}\text{Fe}_{0.09}\text{Mg}_{0.06}\text{Ca}_{0.06}\text{Ti}_{0.03}\text{B}_{3.84}\text{Si}_{10.64}\text{Sb}^{5+}_{1.15}\text{As}^{5+}_{0.72}\text{O}_{69.57}(\text{OH})_{2.09}$.

Mineral Group: Dumortierite supergroup, holtite group.

Occurrence: As coatings on stibiotantalite and replacing tantalite in a pegmatite (Greenbushes, Western Australia); in pegmatites cutting amphibolites (Voron'i massif, Russia); in alluvial gravels derived from pegmatite.

Association: Stibiotantalite, tantalite, tourmaline, microlite, quartz (Greenbushes, Western Australia); stibiotantalite, microlite, tantite (Voron'i massif, Russia).

Distribution: At Bunbury Gully, Greenbushes, Western Australia. From Mount Vasin-Myl'k, Voron'i massif, Kola Peninsula, Russia. From Szklary, Lower Silesia, Poland.

Name: Honors Harold Edward *Holt* (1908-1967), Prime Minister of Australia (1966-1967).

Type Material: Government Chemical Laboratories, Perth, Australia, MDC550.

References: (1) Pryce, M.W. (1971) Holtite: a new mineral allied to dumortierite. *Mineral. Mag.*, 38, 21-25. (2) (1972) *Amer. Mineral.*, 57, 1556 (abs. ref. 1). (3) Voloshin, A.V., V.V. Gordienko, E.M. Gel'man, M.L. Zorina, N.A. Elina, E.A. Kul'chitskaya, Y.P. Men'shikov, L.I. Polezhaeva, R.I. Ryzhova, P.B. Sokolov, and G.I. Utochkina (1977) Holtite (first find in the USSR) and its interaction with other tantalum minerals in rare metal pegmatites. *Zap. Vses. Mineral. Obshch.*, 106, 337-347 (in Russian). (4) Hoskins, B.F., W.G. Mumme, and M.W. Pryce (1989) Holtite, $(\text{Si}_{2.25}\text{Sb}_{0.7})\text{B}[\text{Al}_6(\text{Al}_{0.43}\text{Ta}_{0.27}\square_{0.30})\text{O}_{15}(\text{O},\text{OH})_{2.25}]$: crystal structure and crystal chemistry. *Mineral. Mag.*, 53,

457-463. (5) Groat, L.A., E.S. Grew, R.J. Evans, A. Pieczka, and T.S. Ercit (2009) The crystal chemistry of holtite. *Mineral. Mag.*, 73(6), 1033-1050. (6) Piezka, A., R.J. Evans, E.S. Grew, L.A. Groat, C. Ma, and G.R. Rossman (2013) The dumortierite supergroup. I. A new nomenclature for the dumortierite and holtite groups. *Mineral. Mag.*, 77(6), 2825-2839.