

Thorogummite



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Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Rarely as acicular, radiating crystals, to 3 mm; more commonly as crusts of fine-grained, crystalline aggregates and earthy to dense nodules.

Physical Properties: *Cleavage:* {100}, may be distinct. *Tenacity:* Brittle. *Fracture:* Conchoidal to splintery. Hardness = 4.5–5.5 D(meas.) = 3.26–5.44 D(calc.) = n.d. Radioactive.

Optical Properties: Translucent to opaque. *Color:* Yellow, yellowish brown, greenish brown, brown, nearly white, greenish gray. *Streak:* Brownish. *Luster:* Subvitreous, resinous, dull. *Optical Class:* Isotropic, due to fine aggregation. $n = 1.54\text{--}1.64; 1.74\text{--}1.77$

Cell Data: *Space Group:* $I4_1/amd$. $a = 7.03\text{--}7.08$ $c = 6.23\text{--}6.28$ $Z = 4$

X-ray Powder Pattern: Baringer Hill, Texas, USA.
3.537 (10), 4.695 (9), 2.653 (6), 1.818 (6), 2.821 (4), 2.203 (4), 2.000 (4)

Chemistry:	(1)	(2)	(1)	(2)	
SiO ₂	13.085	15.77	PbO	2.16	1.25
ZrO ₂	0.00		MgO	0.00	0.60
ThO ₂	41.44	57.79	CaO	0.41	1.65
UO ₂	0.00		H ₂ O ⁺	7.88	6.06
UO ₃	22.43	2.98	H ₂ O ⁻	1.23	9.12
Al ₂ O ₃	0.965	0.88	P ₂ O ₅	1.19	1.33
RE ₂ O ₃	6.69	0.97	CO ₂		1.50
Fe ₂ O ₃	0.845		Total	98.325	99.90

(1) Baringer Hill, Texas, USA; corresponds to $(\text{Th}_{0.49}\text{U}_{0.24}^{6+}\text{Ce}_{0.13}\text{Al}_{0.06}\text{Fe}_{0.03}^{3+}\text{Pb}_{0.03}\text{Ca}_{0.02})_{\Sigma=1.00}[(\text{SiO}_4)_{0.67}(\text{PO}_4)_{0.05}]_{\Sigma=0.72}(\text{OH})_{1.32}$. (2) Wodgina, Western Australia.

Occurrence: Formed by weathering of thorium-bearing minerals.

Association: Yttrialite, thorite, thorianite, fergusonite, uraninite.

Distribution: In the USA, from the Baringer Hill pegmatite, 26 km west of Burnet, Llano Co., Texas, and at Easton, Northampton Co., Pennsylvania. From Hybla, Ontario, and Mont Saint-Hilaire, Quebec, Canada. At Svidraya, Sophia district, Bulgaria. In the Sletteval pegmatite, South Harris, Inverness-shire, Scotland. From Wodgina, Western Australia. In Japan, at the Suishoyama and Hayamadake pegmatites, Fukushima Prefecture. In China, from Haicheng Prefecture, Liaoning Province.

Name: For the *thorium* in its composition and gum-like appearance.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 893. (2) Frondel, C. (1953) Hydroxyl substitution in thorite and zircon. *Amer. Mineral.*, 38, 1007–1018. (3) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. *U.S. Geol. Sur. Bull.* 1064, 280–285. (4) Mandarino, J.A. and V. Anderson (1989) *Monteregian Treasures*. Cambridge Univ. Press, 203. (5) Horváth, L. and R.A. Gault (1990) The mineralogy of Mont Saint-Hilaire, Quebec. *Mineral. Record*, 21, 284–359, esp. 343.