

Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. Typically as more or less rough cubes, rarely modified by {111} and {113}, to 9 cm; as rounded grains. *Twinning:* Common on {111}, interpenetrant.

Physical Properties: *Cleavage:* {001}, poor. *Fracture:* Uneven to subconchoidal. *Tenacity:* Brittle. Hardness = 6.5–7, unaltered. VHN = 1132–1278, 1180 average (100 g load). D(meas.) = 9.7–9.8 D(calc.) = 9.991 Radioactive; diamagnetic.

Optical Properties: Opaque, transparent in very thin fragments. *Color:* Black, brownish black, dark gray, dark reddish brown, may have a bronzy tarnish; in transmitted light, dark brown, reddish brown, greenish; gray with red-brown internal reflections in reflected light. *Streak:* Gray to greenish gray. *Luster:* Submetallic when fresh, altering to resinous or hornlike. *Optical Class:* Isotropic; may show weak anomalous anisotropism. $n = 2.20\text{--}2.35$
R: (400) 16.6, (420) 16.6, (440) 16.6, (460) 16.5, (480) 16.3, (500) 16.0, (520) 15.7, (540) 15.4, (560) 15.2, (580) 15.1, (600) 15.0, (620) 14.9, (640) 14.8, (660) 14.7, (680) 14.6, (700) 14.5

Cell Data: *Space Group:* $Fm\bar{3}m$. $a = 5.595$ $Z = 4$

X-ray Powder Pattern: Synthetic; may be confused with uraninite or cerianite. 3.234 (100), 1.689 (64), 1.980 (58), 2.800 (35), 1.284 (26), 1.1432 (20), 1.0779 (19)

Chemistry:	(1)	(2)
UO ₃		18.88
ThO ₂	93.02	62.16
UO ₂	4.73	10.32
(Ce,La) ₂ O ₃		1.84
Fe ₂ O ₃	0.29	1.11
PbO	1.80	2.29
CaO		0.59
H ₂ O		1.05
insol.		0.77
Total	99.84	99.01

(1) Betroka, Madagascar. (2) Galle district, Sri Lanka.

Polymorphism & Series: Forms a series with uraninite.

Occurrence: An accessory mineral in granite pegmatites, more rarely in carbonatites or serpentinites; commonly detrital in heavy mineral concentrates.

Association: Thorite, zircon, ilmenite, cassiterite, allanite (Sri Lanka); phlogopite, diopside, spinel (Andolobe, Madagascar).

Distribution: In Sri Lanka, at Balangoda and near Kondrugala; in the Galle district; at Bambarabotuwa; and elsewhere. In Madagascar, very large crystals from Taolainaro (Fort Dauphin); at Andranondambo, Antanimora, Betroka, Andolobe, and other localities. From Phalaborwa, Transvaal, South Africa. From Russia, in the Kovdor massif, Kola Peninsula; in the Yenisei Range, Siberia; and along the Boshogoch River, Siberia. In the USA, at Easton, Northampton Co., Pennsylvania; from the Nixon Fork and Wiseman districts, Alaska. In Canada, at a number of places in Pontiac Co., Quebec, and elsewhere. Many minor localities are known.

Name: For THORium in the composition.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 620–622. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 47–53. (3) (1953) NBS Circ. 539, 1, 57.

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