

Thalénite-(Y)**Y₃Si₃O₁₀(F, OH)**

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Crystal Data: Monoclinic; commonly metamict. *Point Group:* 2/*m*. As tabular prismatic crystals, to 20 cm; commonly lamellar; as irregular segregations and embedded in fluorite.

Physical Properties: *Fracture:* Conchoidal, uneven to splintery. *Tenacity:* Brittle. Hardness = 6–6.5 D(meas.) = 4.16–4.41 D(calc.) = 4.29

Optical Properties: Transparent to opaque. *Color:* Black, brown, greenish, pink; in thin section, colorless. *Luster:* Greasy.

Optical Class: Biaxial (-). $n = \sim 1.73$ –1.76 when metamict. $\alpha = 1.716$ –1.731 $\beta = 1.716$ –1.739 $\gamma = 1.729$ –1.746 2*V*(meas.) = 68°–79°

Cell Data: *Space Group:* P2₁/*n*. $a = 7.318(2)$ $b = 11.134(3)$ $c = 10.379(3)$
 $\beta = 97.24(2)^\circ$ $Z = 4$

X-ray Powder Pattern: Kingman, Arizona, USA.

3.104 (vs), 2.808 (m+), 5.52 (m), 3.79 (m), 3.276 (m), 3.159 (m), 3.453 (mw)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	29.88	33.75	CaO	0.49	
SnO ₂	0.23		Na ₂ O	0.26	
Al ₂ O ₃	0.45		F	n.d.	3.39
Fe ₂ O ₃	0.30		H ₂ O	2.08	
Y ₂ O ₃	63.35	55.98	CO ₂	1.04	
RE ₂ O ₃		8.00	He, etc.	1.40	
MgO	0.21		–O = F ₂		[1.44]
			Total	99.69	[99.68]

(1) Österby, Sweden. (2) Kola Peninsula, Russia; by X-ray spectroscopy, RE₂O₃ = Gd₂O₃ 0.24%, Dy₂O₃ 1.77%, Ho₂O₃ 0.22%, Er₂O₃ 2.92%, Tm₂O₃ 0.26%, Yb₂O₃ 2.40%, Lu₂O₃ 0.19%; corresponds to [Y_{2.70}Er_{0.08}Yb_{0.07}Dy_{0.05}(Lu, Gd, Tm, Ho)_{0.03}]_{Σ=2.93}Si_{3.06}O₁₀[F_{0.97}(OH)_{0.03}]_{Σ=1.00}.

Occurrence: In granite pegmatites.

Association: Fluocerite, fergusonite, gadolinite, zircon, magnetite, allanite, fluorite, quartz, microcline.

Distribution: In Sweden, from Österby, Dalekarlien, and at Åskagen, Torsbacken, and Forskeelbach, Värmland. In Norway, from Hundholmen, Tysfjord, and Kragerö, Nordland; Högetveit, Evje; and Rossås, Setesdal. In the Pyörönmaa pegmatite, Kangasala, Finland. From the Keivy massif, Kola Peninsula, Russia. In the USA, in the Baringer Hill pegmatite, 26 km west of Burnet, Llano Co., Texas; in the Snowflake feldspar mine, Teller Co., and the White Cloud pegmatite, South Platte district, Jefferson Co., Colorado; and on the Guy Hazen claims, seven km south of Kingman, Mohave Co., Arizona. From Suishoyama and Iizaka, Fukushima Prefecture, and at Nosen, Yamanashi Prefecture, Japan.

Name: For Professor Tobias Robert Thalén (1827–1905), Swedish physicist, and its high yttrium content.

Type Material: n.d.

References: (1) Dana, E.S. (1899) Dana's system of mineralogy, (6th edition), app. I, 68. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 243–246. (3) Fitzpatrick, J. and A. Pabst (1986) Thalénite from Arizona. Amer. Mineral., 71, 188–193. (4) Yakubovich, O.V., A.V. Voloshin, Y.A. Pakhomovskii, and M.A. Simonov (1988) Refined crystal structure of thalénite. Kristallografiya (Sov. Phys. Crystal.), 33, 605–608 (in Russian).

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