

Crystal Data: Monoclinic; commonly metamict. *Point Group:* 2/*m*. Crystals rough; typically prismatic, terminated by {001}, {111}, {221}, and many other forms, to 25 cm; commonly massive.

Physical Properties: *Fracture:* Conchoidal or splintery. *Tenacity:* Brittle. Hardness = 6.5–7 D(meas.) = 4.36–4.77 non-metamict. D(calc.) = 4.41

Optical Properties: Opaque, nearly transparent in thin fragments. *Color:* Black, greenish black, brown; grass-green to olive-green in thin fragments. *Streak:* Greenish gray.

Luster: Vitreous to greasy.

Optical Class: Biaxial (+); isotropic when metamict. *Orientation:* Z ∧ c = 10°.

Dispersion: r < v, strong. α = 1.77–1.78 β = n.d. γ = 1.78–1.82 2V(meas.) = 85°

Cell Data: *Space Group:* P2₁/a. a = 10.000(2) b = 7.565(2) c = 4.768(1)
β = 90.31(2)° Z = 2

X-ray Powder Pattern: Synthetic.

2.818 (100), 2.816 (100), 4.735 (80), 2.932 (70), 2.558 (60), 2.539 (55), 3.118 (50)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SiO ₂	24.35	22.13	23.36	Fe ₂ O ₃	2.03	3.47	
ThO ₂	0.30	0.89	0.00	FeO	11.39	10.43	12.08
Y ₂ O ₃	45.96	22.24	28.55	BeO	10.17	7.19	[9.71]
(Dy, La) ₂ O ₃	3.06	21.23	0.21	CaO	0.30	0.48	0.03
Ce ₂ O ₃	1.65	11.10	2.54	Na ₂ O	0.17	0.46	
RE ₂ O ₃			[21.56]	H ₂ O	0.52	0.86	[0.46]
				Total	99.90	100.48	[98.50]

(1) Ytterby, Sweden. (2) Douglas Co., Colorado, USA. (3) Near Yokkaichi, Mie Prefecture, Japan; by electron microprobe, RE₂O₃ = Pr₂O₃ [1.2%], Nd₂O₃ 4.55%, Sm₂O₃ 2.82%, Eu₂O₃ [0.6%], Gd₂O₃ 2.93%, Tb₂O₃ [1.1%], Dy₂O₃ 4.06%, Ho₂O₃ 1.98%, Er₂O₃ 1.54%, Tm₂O₃ [0.2%], Yb₂O₃ 0.58%, Lu₂O₃ trace, BeO and H₂O from stoichiometry; corresponding to (Y_{1.30}RE_{0.70})_{Σ=2.00}Fe_{0.86}²⁺Be_{2.00}Si_{2.00}[O_{9.72}(OH)_{0.28}]_{Σ=10.00}.

Mineral Group: Gadolinite group.

Occurrence: In granite and alkalic granite pegmatites.

Association: Allanite, fluorite, fergusonite, yttrialite, chevkinite, zircon.

Distribution: Numerous localities worldwide: in Sweden, from Ytterby, on Resarö Island, near Waxholm, and at Kolsva, Västmanland. On Hitterö Island, Flekkefjord; at Slobrekka and Dauren, Iveland; and elsewhere in Norway. From Piz Blas, Val Nalps, also Piz Rondadura and Pizza Rotondo, Val Bedretto, Ticino, Switzerland. In Austria, at Böckstein, near Badgastein, Salzburg. In the USA, in the Clear Creek pegmatite, Burnet Co., and the Baringer Hill pegmatite, 26 km west of Burnet, and at Rode Ranch, near Bluffton, Llano Co., Texas; in Arizona, near Hackberry, Mohave Co.; on Devil's Head Mountain, Douglas Co., and near Lake George, Park Co., Colorado. In Canada, from Loughborough Township, Frontenac Co., Ontario.

Name: For the Finnish chemist, Johan Gadolin (1760–1852), who discovered yttrium.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 509–512. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 235–239. (3) Ito, J. and S.S. Hafner (1974) Synthesis and study of gadolinites. Amer. Mineral., 59, 700–708. (4) Miyawaki, R., I. Nakai, and K. Nagashima (1984) A refinement of the crystal structure of gadolinite. Amer. Mineral., 69, 948–953.

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