

Crystal Data: Orthorhombic (1*O* polytype) or monoclinic (1*M* polytype).

Point Group: 2/*m* 2/*m* 2/*m* or 2/*m*. As prismatic crystals, to 1.2 mm, that display {011}, {012}, {110}, {210}, {201}, {221}, {312}, {100}, {010}, and {001}; in radiating aggregates.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle.

Hardness = ~ 6.5 D(meas.) = n.d. D(calc.) = 4.81-4.86

Optical Properties: Transparent. *Color:* Colorless to faintly pink. *Streak:* White.

Luster: Vitreous.

Optical Class: Biaxial (+). $\alpha = 1.730(5)$ $\beta = 1.740(5)$ $\gamma = 1.760(5)$ 2*V*(meas.) = 56(5)°

2*V*(calc.) = 71.2° *Orientation:* *X* = *c*, *Y* = *b*, *Z* = *a*. (1*O* polytype)

Cell Data: *Space Group:* *Pban*. *a* = 15.993(1) *b* = 5.5306(3) *c* = 9.6590(7) *Z* = 2 (1*O* polytype)

Space Group: *P2/c*. *a* = 11.0602(7) *b* = 5.5280(2) *c* = 16.0195(9) $\beta = 118.925(3)^\circ$ *Z* = 2 (1*M*)

X-ray Powder Pattern: Stetind, Tysfjord, Norway. (mixed 1*M*/1*O* crystal)

3.002 (100, 1*M* and 1*O*), 3.562 (67, 1*M* and 1*O*), 4.914 (53, 1*M*), 5.133 (51, 1*M*), 5.221 (43, 1*O*), 2.756 (41, 1*M* and 1*O*), 2.662 (41, 1*M*), 3.873 (33, 1*M*)

Chemistry:	(1)	(2)		(1)	(2)
CaO	4.46	4.49	Dy ₂ O ₃	4.93	6.68
Na ₂ O	n.d.	0.08	Er ₂ O ₃	3.74	5.19
Y ₂ O ₃	37.90	38.66	Yb ₂ O ₃	4.00	4.44
Ce ₂ O ₃	0.46	n.d.	Al ₂ O ₃	7.31	8.01
Nd ₂ O ₃	1.84	0.43	SiO ₂	18.70	19.05
Sm ₂ O ₃	2.16	0.82	F	9.26	9.40
Gd ₂ O ₃	5.79	2.79	<u>-O = F₂</u>	<u>3.90</u>	<u>3.96</u>
Tb ₂ O ₃	n.d.	0.74	Total	96.65	96.83

(1) Stetind, Tysfjord, Norway; average of 13 electron microprobe analyses supplemented by FTIR spectroscopy, 1*M* polytype; corresponding to Ca_{1.03}(Y_{4.35}Ce_{0.04}Nd_{0.14}Sm_{0.16}Gd_{0.41}Dy_{0.34}Er_{0.25}Yb_{0.26}) $\Sigma=5.75$ Al_{1.86}Si_{4.03}(F_{6.32}O_{17.68}) $\Sigma=24$. (2) Øvre Lapplægeret, Tysfjord, Norway; average of 11 electron microprobe analyses supplemented by FTIR spectroscopy, 1*O* polytype; corresponding to Ca_{1.02}Na_{0.03}(Y_{4.37}Nd_{0.03}Sm_{0.06}Gd_{0.20}Tb_{0.05}Dy_{0.46}Er_{0.35}Yb_{0.29}) $\Sigma=5.81$ Al_{2.00}Si_{4.05}(F_{6.32}O_{17.68}) $\Sigma=24$.

Polymorphism & Series: Polytypes 1*M* and 1*O*.

Occurrence: A late-stage mineral in cavities in yttrian fluorite in granitic NYF-pegmatite.

Association: Bastnäsite-(Ce), hematite, vyuntspakhkite-(Y), hundholmenite-(Y).

Distribution: From Stetind and Øvre Lapplægeret, Tysfjord, Nordland, Norway.

Name: From the chemical symbols for the essential elements in the mineral (*Ca-Y-Al-Si*) and a suffix for the dominant rare-earth element.

Type Material: The Mineralogical Museum, University of Hamburg, Germany (NO-002B/08 -1*O* polytype and NO-002/08 -1*M* polytype).

References: (1) Malcherek, T., J. Schlüter, M. Cooper, N. Ball, and T. Husdal (2015) Cayalsite-(Y), a new rare-earth calcium aluminium fluorosilicate with OD character. *Eur. J. Mineral.*, 27(5), 683-694. (2) (2016) *Amer. Mineral.*, 101, 1920 (abs. ref. 1).