Stetindite-(Ce) $CeSiO_4$

Crystal Data: Tetragonal. *Point Group*: 4/*m* 2/*m* 2/*m*. As diverging aggregates of acicular, often tapered, crystals, to 1.5 mm, displaying tetragonal prism {100} or {110}, pinacoid {001} and an unidentified pyramid.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 4-5 VHN25/50 = 354 D(meas.) = n.d. D(calc.) = 5.03 Nonfluorescent.

Optical Properties: Transparent. *Color*: Pale yellow to colorless. *Streak*: White.
Luster: Adamantine.
Optical Class: Uniaxial (+). *n*(calc.) = 2.01

Cell Data: *Space Group*: $I4_1/amd$. a = 6.9746(7) c = 6.2055(8)

X-ray Powder Pattern: Stetind pegmatite, Tysfjord, 135 km northeast of Bodø, Norway.
3.478 (100), 1.789 (39), 4.616 (30), 2.617 (30), 2.167 (20), 2.451 (18), 1.731 (14)

Chemistry:

	(1)	(2)
CeO_2	65.17	74.13
Y_2O_3	6.35	
Gd_2O_3	1.32	
SiO_2	25.94	25.87
F	0.69	
-O = F	0.29	
Total	99.18	100.00

(1) Stetind pegmatite, Tysfjord, Norway; average electron microprobe analysis supplemented by Raman spectroscopy; corresponds to $(Ce_{0.87}Y_{0.13}Gd_{0.02})_{\Sigma=1.01}Si_{1.00}(O_{3.92}F_{0.08})_{\Sigma=4.00}$. (2) $CeSiO_4$.

Mineral Group: Zircon group.

Occurrence: In cavities in massive yttrian fluorite, a product of a F-rich fluid formed via liquid immiscibility during the cooling of the pegmatite magma.

Association: Hematite, hundholmenite-(Y), quartz, törnebohmite-(Ce), vyuntspakhkite-(Y), calcioancylite-(Nd), kozoite-(Nd), Nd-rich bastnåsite, allanite-(Ce), bastnåsite-(Ce), F-rich britholite-(Y), calcioancylite-(Ce), keiviite-(Y), keiviite-(Yb), kuliokite-(Y), rowlandite-(Y), fluorthalénite-(Y), thorite, uraninite, uranophane-beta, yttrialite-(Y), zircon.

Distribution: From the Stetind pegmatite, Tysfjord, 135 km northeast of Bodø, Norway.

Name: For the locality, *Stetind*, that produced the studied material. The suffix identifies the dominant rare earth element.

Type Material: Mineralogical Museum, University of Hamburg, Germany (NO-001/08).

References: (1) Schülter, J., T. Malcherek, and T.A. Husdal (2009) The new mineral stetindite, $CeSiO_4$, a cerium end-member of the zircon group. Neues Jb. Mineral. Abh., 186, 195-200.
(2) (2010) Amer. Mineral., 95, 207 (abs. ref. 1). (3) Strzelecki, A.C., T. Barral, P. Estevenon, A. Mesbah, V. Goncharov, J. Baker, J. Bai, N. Clavier, S. Szenknect, A. Migdisov, H. Xu, R.C. Ewing, N. Dacheux, and X. Guo (2021) The Role of Water and Hydroxyl Groups in the Structures of Stetindite and Coffinite, $MSiO_4$ (M = Ce, U). Inorganic Chemistry, 60(2), 718-735.