

Fluorbritholite-(Y)**(Y,Ca,Ln)₅[(Si,P)O₄]₃F**

Crystal Data: Hexagonal. *Point Group:* 6/m. As short-prismatic to thick-tabular crystals to 4 cm; as rims on fluorapatite; granular.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven to conchoidal. *Tenacity:* Brittle. *Hardness* = 5.5 D(meas.) = n.d. D(calc.) = 4.609

Optical Properties: Transparent. *Color:* Light pink-brown to brown-pink, light brown, dark brown. *Streak:* Pale brown to almost white. *Luster:* Vitreous to greasy; resinous [metamict].
Optical Class: Uniaxial (-). $\omega = 1.784(2)$ $\varepsilon = 1.789(3)$
Anomalously biaxial (+). $\alpha = 1.784(2)$ $\beta = 1.784(2)$ $\gamma = 1.789(3)$ $2V(\text{meas.}) = 10(5)^\circ$

Cell Data: *Space Group:* P6₃/m. $a = 9.464(2)$ $c = 6.845(2)$ $Z = 2$

X-ray Powder Pattern: Lagmannsvik, Hamarøy, Nordland, Norway.
2.826 (100), 2.775 (58), 2.737 (46), 3.102 (29), 1.948 (25), 1.839 (28), 4.104 (27)

Chemistry:	(1)		(1)
CaO	12.21	Dy ₂ O ₃	2.80
MnO	1.06	Er ₂ O ₃	2.61
Y ₂ O ₃	30.80	Yb ₂ O ₃	3.75
La ₂ O ₃	1.13	SiO ₂	24.18
Ce ₂ O ₃	7.12	P ₂ O ₅	0.29
Pr ₂ O ₃	0.69	F	2.01
Nd ₂ O ₃	6.85	<u>-O=(F)₂</u>	<u>0.85</u>
Sm ₂ O ₃	2.15	Total	99.03
Gd ₂ O ₃	2.23		

(1) Lagmannsvik, Hamarøy, Nordland, Norway; average of 4 electron microprobe analyses supplemented by FTIR analysis; corresponding to [(Y_{2.013}Ce_{0.320}Nd_{0.300}Yb_{0.140}Dy_{0.111}Er_{0.101}Gd_{0.091}Sm_{0.091}La_{0.051}Pr_{0.031})_{Σ=3.249}Ca_{1.607}Mn_{0.110}]_{Σ=4.966}[(Si_{2.970}P_{0.030})_{Σ=3}O₁₂][F_{0.781}O_{0.210}(OH)_{0.009}]_{Σ=1}.

Mineral Group: Apatite supergroup, britholite group.

Occurrence: In pegmatite cutting alkaline granite.

Association: Y-bearing fluorite, allanite-(Ce), quartz, aluminocerite-(Ce), bastnäsite-(Ce), britholite-(Y), gadolinite-(Y), hundholmenite-(Y), minerals of the thalénite-(Y)-fluorthalénite-(Y) series, kainosite-(Y), tengerite-(Y) [Lagmannsvik]; fluorapatite, quartz, fluorite, allanite-(Ce) [Kråkmo].

Distribution: From Lagmannsvik and Kråkmo, Hamarøy, Nordland, Norway, and at Mt. Vyuntspakhk, Western Keivy, Kola Peninsula, Russia.

Name: As the *fluorine-dominant* analogue of *britholite-(Y)*.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (#3762/1).

References: (1) Pekov, I.V., N.V. Zubkova, N.V. Chukanov, T.A. Husdal, A.E. Zadov, and D.Y. Pushcharovsky (2011) Fluorbritholite-(Y), (Y,Ca,Ln)₅[(Si,P)O₄]₃F, a new mineral of the britholite group. N. Jb. Mineral. Abh., 188(2), 191-197.

(2) (2011) Amer. Mineral., 96, 1909-1910 (abs. ref. 1).