Bastnäsite-(Y) $Y(CO_3)F$

Crystal Data: Hexagonal. *Point Group:* $\bar{6}2c$. Irregular grains, to 4 μm, aggregated into compact pseudomorphs after large gagarinite-(Y) crystals.

Physical Properties: Hardness = [4–4.5] [by analogy to bastnäsite-(Ce)].
D(meas.) = 3.9–4.0 D(calc.) = n.d.

Optical Properties: Semitransparent. *Color:* Brick-red to carmine-red; pale brown in transmitted light.
Optical Class: Uniaxial (+). n = 1.66–1.67 ω = n.d. ϵ = n.d.

Cell Data: *Space Group:* [$P\bar{6}2c$] [by analogy to bastnäsite-(Ce)]. a = 6.57(20 c = 9.48(2)
Z = 6

X-ray Powder Pattern: Verkhne-Espe massif, Kazakhstan.
2.78 (10), 1.948 (10), 3.43 (7.5), 1.976 (7.5), 1.822 (7.5), 1.260 (5), 1.608 (4)

Chemistry:

	(1)
CO_2	18.99
SiO_2	3.00
ThO_2	0.72
RE_2O_3	60.00
Al_2O_3	0.40
Fe_2O_3	3.3
CaO	4.09
K_2O	0.40
F	7.28
H_2O^+	0.74
H_2O^-	4.36
$-O = F_2$	3.10
Total	[100.18]

(1) Verkhne-Espe massif, Kazakhstan; original total given as 100.12%, RE = Y 40.1%, La 1.4%, Ce 7.0%, Pr 1.8%, Nd 6.2%, Sm 5.3%, Eu 0.6%, Gd 6.8%, Tb 1.6%, Dy 11.0%, Ho 2.6%, Tm 1.1%, Yb 5.3%, Lu 1.7%; after deduction of microcline 2.4%, hematite 3.3%, fluorite 3%, and quartz 1.5%, corresponds to $[(Y_{0.36}Dy_{0.10}Er_{0.07}RE_{0.37})_{0.90}Ca_{0.09}Th_{0.01}]_{\Sigma=1.00}(CO_3)_{1.00}[F_{0.73}(OH)_{0.19}]_{\Sigma=0.92}$.

Occurrence: A rare secondary mineral in a microcline–quartz pegmatite vein.

Association: Gagarinite-(Y), fluorite, microcline, hematite, quartz.

Distribution: In the Verkhne-Espe alkaline massif, Tarbagatai Range, Kazakhstan.

Name: As a *bastnäsite* species with dominant *yttrium*.

Type Material: Institute of Mineralogy, Geochemistry and Crystal Chemistry of Rare Elements, Moscow; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, vis1961 and vis1962.

References: (1) Mineev, D.A., T.I. Lavrischeva, and A.V. Bykova (1970) Yttrian bastnaesite – an alteration product of gagarinite. Zap. Vses. Mineral. Obshch., 99, 328–332. (2) (1972) Amer. Mineral., 57, 594 (abs. ref. 1). (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 36.