

Synchysite-(Y)**Ca(Y, Ce)(CO₃)₂F**

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Crystal Data: Monoclinic, pseudohexagonal. *Point Group:* 2/*m*. Crystals exhibit [using pseudohexagonal indices] {11 $\bar{2}$ 1} and {0001}, with smaller {10 $\bar{1}$ 0}, {02 $\bar{2}$ 1}, {33 $\bar{6}$ 5}, {5.5. $\bar{1}$ 0.3}, to 0.2 mm; typically in very fine-grained aggregates.

Physical Properties: Hardness = ~4.5 D(meas.) = 3.9 D(calc.) = [3.88]

Optical Properties: Transparent to translucent. *Color:* Red-brown, pale yellow, pale pink, colorless. *Luster:* Greasy.

Optical Class: Uniaxial (+). ω = 1.643–1.645 ϵ = 1.73–1.74

Cell Data: *Space Group:* C2/*c*. a = 12.039(3) b = 6.950(1) c = 18.436(6)
 β = 102.45(2)° Z = 12

X-ray Powder Pattern: Cotopaxi, Colorado, USA.

1.89 (10), 2.00 (9), 1.83 (9), 1.37 (9), 2.75 (8), 3.47 (7), 1.26 (7)

Chemistry:

	(1)	(2)
CO ₂	31.4	29.98
Y ₂ O ₃	24.	19.23
Ce ₂ O ₃		27.95
RE ₂ O ₃	[22.1]	
CaO	18.5	19.10
F	5.7	6.47
–O = F ₂	2.4	2.73
Total	[99.3]	100.00

(1) Near Cotopaxi, Colorado, USA; RE₂O₃ by difference, after deduction of kainosite 10.8% and Fe₂O₃ 1%, corresponds to Ca_{1.0}(Y_{0.6}RE_{0.4})_{Σ=1.0}(CO₃)_{2.0}F_{0.9}. (2) Ca(Y, Ce)(CO₃)₂F with Y:Ce = 1:1.

Occurrence: A rare hydrothermal accessory mineral in alkalic granites and granite pegmatites.

Association: Kainosite, bastnäsite, xenotime, hematite, quartz (Dover, New Jersey, USA).

Distribution: In the USA, from the Scrub Oaks iron mine, Mine Hill, 4 km west of Dover, Morris Co., New Jersey; at the Henry pegmatite, near Cotopaxi, Fremont Co., and the Big Bertha and White Cloud pegmatites, South Platte district, Jefferson Co., Colorado; from Rib Mountain, Marathon Co., Wisconsin. In the Evans-Lou quarry, near Wakefield, Quebec, Canada. Around Galt y Wenallt, Gwynedd, Wales. On the west flank of Cherbadung [Pizzo Cervandone], Binntal, Valais, Switzerland. At Bad Grund, Harz Mountains, Germany. Crystallized in the Bantyshevo salt stock, Dnieper-Donets Basin, Ukraine. From the Jabal Sa'id pegmatite, central Saudi Arabia. At Xiaocaidan, Qinghai Province, China.

Name: For its relation to *synchysite*-(Ce) and dominant *yttrium*.

Type Material: n.d.

References: (1) Smith, W.L., J. Stone, D.R. Ross, and H. Levine (1960) Doverite [= synchysite-(Y)], a possible new yttrium fluorocarbonate from Dover, Morris Co., New Jersey. *Amer. Mineral.*, 45, 92–98. (2) Levinson, A.A. and R.A. Borup (1962) Doverite [= synchysite-(Y)] from Cotopaxi, Colorado. *Amer. Mineral.*, 47, 337–343. (3) Levinson, A.A. (1966) A system of nomenclature for rare-earth minerals. *Amer. Mineral.*, 51, 152–158. (4) Kvasnitsa, V.B., N.B. Navaleva, V.A. Shumlyanskiy, and N.V. Zhikalyak (1990) New rare-earth carbonate and phosphate finds in the Ukraine. *Doklady Acad. Nauk SSSR*, 314, 455–458 (in Russian). (5) Liben Wang and Kangjing Zhou (1995) The crystal structure of synchysite-(Y), YCa(CO₃)F. *Acta Petrologica Mineralogica*, 14(4), 336–344 (in Chinese with English abs.).

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