Parisite-(La) $CaLa_2(CO_3)_3F_2$

Crystal Data: Monoclinic (pseudo-trigonal). *Point Group*: 2, *m* or 2/*m*. As nuclei, to 5 mm, in doubly-terminated, pseudo-hexagonal crystals with corrugated faces, to 8.2 cm. The crystals display acute pseudodipyramids with horizontally striated faces, terminated by a pinacoid. Crystals appear prismatic due to oscillatory combination of steep pyramids. Also, as crusts of microcrystals.

Physical Properties: *Cleavage*: Distinct on {001}. *Fracture*: Laminated, conchoidal or uneven. *Tenacity*: Brittle. Hardness = 4-5 D(meas.) = n.d. D(calc.) = 4.273

Optical Properties: Transparent. *Color*: Yellow-green to white, colorless in transmitted light. *Streak*: White. *Luster*: Vitreous to dull.
Optical Class: Pseudo-uniaxial (+). ω = 1.670(2) ε = 1.782(5)

Cell Data: Space Group: *C*2, *Cm* or *C*2/*m*. a = 12.356(1) b = 7.1368(7) c = 28.299(3) β = 98.342(4)° Z = 12

X-ray Powder Pattern: Mula mine, Tapera village, Novo Horizonte, Bahia, Brazil.
2.827 (100), 3.555 (88), 2.055 (58), 13.95 (55), 1.950 (38), 4.655 (37), 1.880 (36)

Chemistry:

	(1)	(2)	(3)
CaO	10.10	9.45	10.46
Y_2O_3	0.52	0.51	
La_2O_3	24.77	24.82	60.80
Ce_2O_3	11.16	12.99	
Pr_2O_3	4.73	7.95	
Nd_2O_3	15.82	14.77	
Sm_2O_3	1.25	1.24	
Eu_2O_3	0.07	0.07	
F	7.30	6.71	7.09
CO_2	[24.50]	[24.70]	24.63
$-O = F_2$	3.07	2.82	2.98
Total	97.15	100.39	100.00

(1) Mula mine, Novo Horizonte, Bahia, Brazil; average of 25 electron microprobe analyses supplemented by IR and Raman spectroscopy, CO_2 calculated for charge neutrality from TGA; corresponds to $Ca_{0.89}(La_{0.83}Nd_{0.51}Ce_{0.37}Pr_{0.16}Sm_{0.04}Y_{0.03})_{\Sigma=1.94}C_{3.03}O_{8.91}F_{2.09}$. (2) Do.; corresponds to $Ca_{0.91}(La_{0.82}Nd_{0.47}Ce_{0.43}Pr_{0.26}Sm_{0.04}Y_{0.02})_{\Sigma=2.04}(CO_3)_3F_{1.91}$. (3) $CaLa_2(CO_3)_3F_2$.

Occurrence: In brecciated, hydrothermal quartz veins cemented by chalcedony hosted by metarhyolite formed as a result of peraluminous and alkaline magmatism during continental rifting.

Association: Almedaite, hematite, rutile, fluocerite-(Ce), brockite, monazite-(La), rhabdophane-(La), bastnasite-(La).

Distribution: At the Mula mine, Tapera village, Novo Horizonte, Bahia, Brazil. Třebíč durbachite massif, SW Moravia, Czech Republic; at the eastern part of Samos island, Greece; in unspecified alkaline rocks in Romania; in the Cerro Boggiani massif, Alto Paraguay Province, Paraguay. In the USA at Bear Lodge carbonatite, Wyoming.

Name: Designates the *La*-dominant analogue of *parisite*-(Ce).

Type Material: Museum, Institute of Geosciences, University of São Paulo, Brazil (DR1032) and University of Arizona Mineral Museum, Tucson, Arizona, USA (RRUFF Project # R130687).

References: (1) Menezes Filho, L.A.D., M.L.S.C. Chaves, N.V. Chukanov, D. Atencio, R. Scholz, I. Pekov, G. Magela da Costa, S.M. Morrison, M.B. Andrade, E.T.F. Freitas, R.T. Downs, and D.I. Belakovskiy (2018) Parisite-(La), ideally $CaLa_2(CO_3)_3F_2$, a new mineral from Novo Horizonte, Bahia, Brazil. Mineral. Mag., 82(1), 133-144. (2) (2019) Amer. Mineral., 104(5), 783 (abs. ref 1).