Calderonite $Pb_2Fe^{3+}(VO_4)_2(OH)$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As striated prismatic to tabular crystals, to 1 mm, in parallel bundles.

Physical Properties: *Cleavage*: n.d. *Fracture*: Splintery. *Tenacity*: Brittle. Hardness = 3-4
D(meas.) = n.d. D(calc.) = 6.04

Optical Properties: Semitransparent to translucent. *Color*: Red-orange to red-brown. *Streak*: Red. *Luster*: Vitreous to resinous (if altered).
Optical Class: Biaxial (+). 2Vx = 86° *Pleochroism*: Strong, *X* = light greenish brown, *Y* = brown, *Z* = reddish brown. *Dispersion*: Strong.

Cell Data: *Space Group*: $P2_1/m$. $a = 7.649(1)$ $b = 6.101(1)$ $c = 8.904(1)$ $\beta = 112.23(1)°$ Z = 2

X-ray Powder Pattern: Santa Marta, Badajoz province, Spain.
3.242 (100), 2.980 (48), 2.746 (48), 4.893 (43), 4.166 (34), 3.058 (25), 3.401 (21)

Chemistry:

	(1)	(2)
PbO	61.80	62.25
CaO	0.03	
BaO	0.32	
Mn_2O_3	<0.01	
Fe_2O_3	10.12	11.13
CuO	0.67	
ZnO	0.09	
Al_2O_3	0.11	
V_2O_5	23.86	25.36
As_2O_5	0.13	
P_2O_5	0.57	
SiO_2	0.33	
H_2O	1.91	1.26
Total	99.94	100.00

(1) Santa Marta, Badajoz province, Spain; average of 21 electron microprobe analyses, H_2O by DTA and thermogravimetric analysis; corresponds to $(Pb_{1.950}Ca_{0.004}Ba_{0.015})_{\Sigma=1.968}(Fe^{3+}_{0.892}Cu_{0.059}Zn_{0.008}Al_{0.015})_{\Sigma=0.974}(V_{1.847}Si_{0.039}P_{0.057}As_{0.008})_{\Sigma=1.950}O_{7.507}(OH)_{1.493}$. (2) $Pb_2Fe^{3+}(VO_4)_2(OH)$.

Polymorphism & Series: Series with brackebuschite likely.

Mineral Group: Brackebuschite group.

Occurrence: In the upper oxidation zone of Pb-Zn hydrothermal deposits.

Association: Mottramite, descloizite, vanadinite.

Distribution: At Las Colmenitas and Los Llanos mine, 2 km northwest of Santa Marta [TL] and the La Muda mine, Azuaga, Badajoz province, Spain.

Name: Honors Professor Salvador *Calderón*, (1852-1911), for his contributions to the mineralogy of Spain.

Type Material: Mineralogical Museum, Spanish Geological Survey, Madrid, Spain (MGM-7748); Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 83252).

References: (1) González Del Tánago, J., Á. La Iglesia, J. Rius, and S. Frenández Santín (2003) Calderonite, a new lead-iron-vanadate of the brackebuschite group . Amer. Mineral., 88, 1703-1708.