Mounanaite $PbFe_2^{3+}(VO_4)_2(OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals elongated along [001], flattened on {010}, to 0.3 mm; equant crystals appear pseudohexagonal; crystals are dominated by {010}, with {100}, {110}, {011}, {11$\overline{1}$}, {12$\overline{1}$}, {$\overline{1}$2$\overline{1}$}, {02$\overline{1}$}, {01$\overline{1}$}, {021}; as microcrystalline crusts. *Twinning:* Common as simple twins of two types, by rotation around [001] or on {1$\overline{1}$1}.

Physical Properties: *Cleavage:* On {001}, good. Hardness = 4.5 D(meas.) = 4.85 D(calc.) = 4.88–4.89

Optical Properties: Translucent to transparent. *Color:* Reddish brown. *Optical Class:* Biaxial (–). *Pleochroism:* Strong; $X = Z$ = pale yellow; Y = brown. *Orientation:* $Y = b$; $X \wedge c = \sim 20°$. *Dispersion:* $r > v$, strong. α = [2.19] β = 2.25(2) γ = [2.27] 2V(meas.) = 50(10)°

Cell Data: *Space Group:* $C2/m$. a = 9.294 b = 6.164–6.166 c = 7.703–7.713 β = 115.54°−115.57° Z = 2

X-ray Powder Pattern: Mounana mine, Gabon.
4.64 (100), 3.055 (96), 3.264 (92), 7.766 (72), 2.816 (60), 2.320 (59), 4.562 (49)

Chemistry:

	(1)	(2)
P_2O_5	0.81	
As_2O_5	0.18	
V_2O_5	29.28	31.21
Al_2O_3	0.32	
Fe_2O_3	26.01	27.40
CuO	0.87	
PbO	38.47	38.30
H_2O	[3.21]	3.09
Total	[99.15]	100.00

(1) Mounana mine, Gabon; by electron microprobe, total Fe as Fe_2O_3, confirmed by IR and Mössbauer spectroscopy, $(OH)^{1-}$ calculated for charge balance; corresponds to $Pb_{1.02}(Fe_{1.92}Al_{0.04}Cu_{0.06})_{\Sigma=2.02}[(VO_4)_{1.92}(PO_4)_{0.07}(AsO_4)_{0.01}]_{\Sigma=2.00}(OH)_{2.04}$. (2) $PbFe_2(VO_4)_2(OH)_2$.

Mineral Group: Tsumcorite group.

Occurrence: A rare mineral in the oxidized zone of a sediment-hosted U–V deposit.

Association: Francevillite, curienite, vanuralite, goethite.

Distribution: From the Mounana uranium mine, Franceville, Gabon.

Name: For the Mounana mine, Gabon, the locality that produced the first specimens.

Type Material: University of Pierre and Marie Curie, Paris, 11647; National School of Mines, Paris, France.

References: (1) Cesbron, F. and J. Fritsche (1969) La mounanaïte, nouveau vanadate der fer et de plomb hydraté. Bull. Minéral., 92, 196–202 (in French with English abs.). (2) (1969) Amer. Mineral., 54, 1738–1739 (abs. ref. 1). (3) Krause, W., K. Belendorff, H.-J. Bernhardt, C. McCammon, H. Effenberger, and W. Mikenda (1998) Crystal chemistry of the tsumcorite-group minerals. New data on ferrilotharmeyerite, tsumcorite, thometzekite, mounanaite, helmutwinklerite, and a redefinition of gartrellite. Eur. J. Mineral., 10, 179–206.