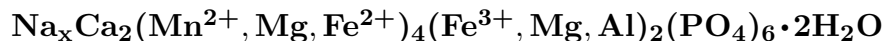


Bederite

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Ellipsoidal masses, to 5 cm. *Twinning:* Small optical domains resemble “tartan” twinning in microcline.

Physical Properties: *Cleavage:* {100}, good. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 5 D(meas.) = 3.48(1) D(calc.) = 3.50

Optical Properties: Semitransparent. *Color:* Dark brown to black; brown to olive-green in thin fragments. *Streak:* Dark olive-green. *Luster:* Vitreous.

Optical Class: Biaxial (-). *Pleochroism:* $X = Y$ = olive-green; Z = brown. *Orientation:* $X = a$; $Y = c$; $Z = b$. *Dispersion:* $r < v$, strong. *Absorption:* $X = Y > Z$. $\alpha = 1.729(3)$ $\beta = 1.738(3)$ $\gamma = 1.741(3)$ $2V(\text{meas.}) = 54^\circ$ $2V(\text{calc.}) = 60^\circ$

Cell Data: *Space Group:* $Pcab$. $a = 12.559(2)$ $b = 12.834(1)$ $c = 11.714(2)$ $Z = 4$

X-ray Powder Pattern: El Peñón pegmatite, Argentina.

2.768 (100), 2.927 (78), 3.006 (67), 2.814 (35), 2.110 (33), 6.419 (31), 2.856 (31)

Chemistry:

	(1)
P ₂ O ₅	41.76
Al ₂ O ₃	0.82
Fe ₂ O ₃	12.00
FeO	2.25
MnO	20.59
ZnO	0.40
MgO	3.45
CaO	10.91
SrO	0.43
Na ₂ O	0.63
H ₂ O	3.52
Total	96.76

(1) El Peñón pegmatite, Argentina; by electron microprobe, average of nine analyses; Fe²⁺:Fe³⁺ from crystal-structure analysis, total Mn as MnO, H₂O by the Penfield method; corresponds to (Na_{0.21}Ca_{0.03})_{Σ=0.24}(Ca_{1.96}Sr_{0.04})_{Σ=2.00}(Mn_{2.98}²⁺Mg_{0.65}Fe_{0.32}²⁺Zn_{0.05})_{Σ=4.00}(Fe_{1.54}³⁺Mg_{0.23}Al_{0.17})_{Σ=1.94}(PO₄)_{6.03}•2H₂O.

Occurrence: Of rare occurrence in a complex granite pegmatite in mica schist.

Association: Muscovite, quartz, potassic feldspar.

Distribution: From the El Peñón pegmatite, El Quemado district, Nevados de Palermo, Salta Province, Argentina.

Name: Honors Roberto Beder (1888–1930), Swiss-Argentinian mineralogist.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 81556.

References: (1) Galliski, M.A., M.A. Cooper, F.C. Hawthorne, and P. Černý (1999) Bederite, a new pegmatite phosphate mineral from Nevados de Palermo, Argentina: description and crystal structure. *Amer. Mineral.*, 84, 1674–1679.