

Perloffite

 $\text{Ba}(\text{Mn}^{2+}, \text{Fe}^{2+})_2\text{Fe}_2^{3+}(\text{PO}_4)_3(\text{OH})_3$

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals resemble spearheads, to 1 mm, showing {001}, $\{\bar{1}01\}$, {021}, $\{\bar{1}31\}$. Parallel and radial growths are common; may be massive.

Physical Properties: *Cleavage:* On {100}, perfect. Hardness = ~ 5 D(meas.) = n.d. D(calc.) = 4.00

Optical Properties: Semitransparent. *Color:* Black, dark brown, deep clove-brown, khaki-brown, greenish brown, reddish brown. *Streak:* Greenish yellow. *Luster:* Vitreous to subadamantine.

Optical Class: Biaxial (-). *Pleochroism:* $X = Z =$ dark greenish brown; $Y =$ light greenish brown. *Orientation:* $X = b$; $Y \wedge c = -42^\circ$. *Dispersion:* $r \ll v$. *Absorption:* $X = Z > Y$. $\alpha = 1.793(5)$ $\beta = 1.803(5)$ $\gamma = 1.808(5)$ $2V(\text{meas.}) = 70^\circ - 80^\circ$

Cell Data: *Space Group:* $P2_1/m$. $a = 9.223(5)$ $b = 12.422(8)$ $c = 4.995(2)$
 $\beta = 100.39(4)^\circ$ $Z = 2$

X-ray Powder Pattern: Big Chief mine, South Dakota, USA.
3.166 (10), 2.73 (8b), 2.982 (5), 3.105 (4), 2.939 (4), 2.070 (4), 5.12 (3)

Chemistry:

| | (1) | (2) |
|-------------------------|------|-------|
| P_2O_5 | 30.5 | 30.75 |
| As_2O_5 | | 0.46 |
| Al_2O_3 | 0.3 | 1.19 |
| Fe_2O_3 | 26.7 | 25.75 |
| MnO | 14.3 | 14.74 |
| MgO | 0.6 | 0.20 |
| CaO | 1.5 | 1.53 |
| BaO | 19.6 | 24.43 |
| H_2O | n.d. | n.d. |
| Total | 93.5 | 99.05 |

(1) Big Chief mine, South Dakota, USA; by electron microprobe, 11 points on 3 crystals, converted from elemental analysis; total Mn as MnO, total Fe reported as Fe_2O_3 then $\text{Fe}^{2+}:\text{Fe}^{3+}$ apportioned for stoichiometry; corresponds to $(\text{Ba}_{0.89}\text{Ca}_{0.09})_{\Sigma=0.98}(\text{Mn}_{1.41}\text{Fe}_{0.37}^{2+}\text{Mg}_{0.11}\text{Ca}_{0.11})_{\Sigma=2.00}(\text{Fe}_{1.96}^{3+}\text{Al}_{0.04})_{\Sigma=2.00}(\text{PO}_4)_3(\text{OH})_3$. (2) Spring Creek mine, Australia; by electron microprobe, total Mn as MnO; total Fe reported as Fe_2O_3 then $\text{Fe}^{2+}:\text{Fe}^{3+}$ apportioned for stoichiometry; corresponds to $\text{Ba}_{1.09}(\text{Mn}_{1.43}\text{Fe}_{0.38}^{2+}\text{Ca}_{0.19}\text{Mg}_{0.03})_{\Sigma=2.03}(\text{Fe}_{1.84}^{3+}\text{Al}_{0.16})_{\Sigma=2.00}[(\text{P}_{0.99}\text{As}_{0.01})_{\Sigma=1.00}\text{O}_4]_3(\text{OH})_3$.

Mineral Group: Bjarebyite group.

Occurrence: A rare secondary mineral in a complex zoned granite pegmatite (Big Chief mine, South Dakota, USA).

Association: Ludlamite, huréaulite, siderite, triphylite (Big Chief mine, South Dakota, USA); barite, copper, apatite (Spring Creek mine, Australia).

Distribution: From the Big Chief mine, one km south of Glendale, Pennington Co., South Dakota, USA. In the Spring Creek copper mine, near Wilmington, South Australia. At Hagedorf, Bavaria, Germany.

Name: Honoring Louis Perloff (1907–2004), American lawyer and collector of microscopic minerals, Tryon, North Carolina, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 135925, 137015.

References: (1) Kampf, A.R. (1977) A new mineral: perloffite, the Fe^{3+} analogue of bjarebyite. Mineral. Record, 8, 112–114. (2) (1977) Amer. Mineral., 62, 1059 (abs. ref. 1). (3) Birch, W.D. and W.G. Mumme (1988) Hentschelite and perloffite from the Spring Creek Copper Mine, South Australia. Mineral. Mag., 52, 408–411.

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