

Magnetoplumbite

Pb(Fe³⁺, Mn³⁺)₁₂O₁₉

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Crystal Data: Hexagonal. *Point Group:* 6/m 2/m 2/m. Crystals are steep dipyrramids, to 6 mm; granular, massive.

Physical Properties: *Cleavage:* {0001}, perfect. *Hardness* = 6 VHN = 755–777 (Mn-rich, 100 g load); 841–868 (Fe-rich, 100 g load). *D(meas.)* = 5.517 *D(calc.)* = 5.57 (synthetic PbFe₁₂³⁺O₁₉). Strongly magnetic.

Optical Properties: Opaque. *Color:* Gray-black; gray in reflected light. *Streak:* Dark brown. *Luster:* Metallic, brilliant.

Optical Class: Uniaxial. *Pleochroism:* Weak. *Anisotropism:* Distinct.

R₁–R₂: (400) 25.6–28.5, (420) 25.1–27.6, (440) 24.6–26.7, (460) 24.2–26.0, (480) 23.8–25.6, (500) 23.6–25.3, (520) 23.3–25.0, (540) 23.0–24.6, (560) 22.7–24.2, (580) 22.3–23.8, (600) 22.0–23.5, (620) 21.7–23.2, (640) 21.3–22.8, (660) 21.1–22.6, (680) 20.9–22.3, (700) 20.7–22.2

Cell Data: *Space Group:* P6₃/mmc. *a* = 5.9015–5.926 *c* = 23.023–23.230 *Z* = 2

X-ray Powder Pattern: Långban, Sweden.

2.766 (10), 2.953 (8), 2.427 (8), 2.235 (7), 1.476 (7), 4.99 (6), 1.667 (6)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Sb ₂ O ₅		0.01	1.87	ZnO		0.86	0.72
TiO ₂	4.14	4.14	10.24	PbO	20.02	19.16	18.80
Al ₂ O ₃	1.86	1.05	1.67	MgO	0.15	0.11	0.56
Fe ₂ O ₃	52.22	52.89	50.44	CaO	0.28		
Mn ₂ O ₃	17.27	18.91	5.90	BaO		0.09	0.37
Cr ₂ O ₃	0.25	0.16	0.11	H ₂ O	0.08		
MnO	3.73	2.83	9.20				
				Total	100.00	100.21	99.88

(1) Långban, Sweden; corresponds to Pb_{1.05}(Fe_{7.66}³⁺Mn_{2.56}³⁺Mn_{0.62}²⁺Ti_{0.60}Al_{0.42}Ca_{0.06}Mg_{0.04}Cr_{0.04})_{Σ=12.00}O₁₉. (2) Do.; by electron microprobe, Mn²⁺:Mn³⁺ from charge balance; corresponds to Pb_{1.00}(Fe_{7.72}³⁺Mn_{2.79}³⁺Ti_{0.60}Mn_{0.47}²⁺Al_{0.24}Zn_{0.12}Mg_{0.03}Cr_{0.02}Ba_{0.01})_{Σ=12.00}O₁₉. (3) Do.; by electron microprobe, Mn²⁺:Mn³⁺ from charge balance; corresponds to (Pb_{0.98}Ba_{0.02})_{Σ=1.00}(Fe_{7.34}³⁺Mn_{1.51}²⁺Ti_{1.49}Mn_{0.87}³⁺Al_{0.38}Mg_{0.16}Sb_{0.13}Zn_{0.10}Cr_{0.02})_{Σ=12.00}O₁₉.

Mineral Group: Magnetoplumbite group.

Occurrence: In skarns associated with metamorphosed Fe–Mn orebodies (Sweden).

Association: Melanotekite-kentrolite, hematite, jacobsonite, hedyphane, braunite, pyrophanite, manganoan phlogopite, calcite, andradite, celsian (Sweden).

Distribution: In Sweden, from Långban; in the Harstigen mine, near Persberg; and at Jakobsberg, Värmland.

Name: For being a MAGNETic oxide of iron, manganese, and lead, *plumbum*.

Type Material: Swedish Museum of Natural History, Stockholm, Sweden, 24639.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 728. (2) Burke, E.A.J. (1980) New data on magnetoplumbite from Långban, Sweden. Neues Jahrb. Mineral., Monatsh., 141–148. (3) Moore, P.B., P.K. Sen Gupta, and Y. Le Page (1989) Magnetoplumbite, Pb²⁺Fe₁₂³⁺O₁₉: refinement and lone-pair splitting. Amer. Mineral., 74, 1186–1194. (4) Holtstam, D. (1994) Mineral chemistry and parageneses of magnetoplumbite from the Filipstad district, Sweden. Eur. J. Mineral., 6, 711–724.

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