Hematophanite $Pb_4Fe_3^{3+}O_8(OH, Cl)$

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Crystal Data: Tetragonal. *Point Group:* 4*mm*. As tablets, thin ⊥ {001}, to 5 mm, and in lamellar to granular aggregates.

Physical Properties: *Cleavage:* {001}, good; a parting inclined to {001} suspected. Hardness = 2–3 D(meas.) = 7.70 D(calc.) = 8.186

Optical Properties: Opaque, transparent through thin edges. *Color:* Deep reddish brown; blood-red in transmitted light. *Streak:* Orange. *Luster:* Submetallic.
Optical Class: Uniaxial (–); low birefringence.
R_1–R_2: n.d.

Cell Data: *Space Group: P4mm*. $a = 3.92$ $c = 15.31$ $Z = 1$

X-ray Powder Pattern: Långban, Sweden. (ICDD 27-271).
2.76 (100), 2.71 (100), 3.90 (60), 1.590 (60), 3.77 (40), 1.566 (40), 2.24 (35)

Chemistry:

	(1)		(1)
Fe_2O_3	22.01	Na_2O	0.38
$FeTiO_3$	0.20	K_2O	0.17
FeO	0.22	Cl	2.17
MnO	0.29	H_2O^+	0.73
PbO	73.26	$-O = Cl_2$	0.49
MgO	0.06	insol.	0.42
CaO	0.26	Total	99.68

(1) Jakobsberg, Sweden; average of two analyses, corresponding to $(Pb_{3.59}Na_{0.13}Ca_{0.05}K_{0.04})_{\Sigma=3.81}(Fe^{3+}_{3.01}Mn_{0.05}Fe^{2+}_{0.05}Mg_{0.02}Ti_{0.01})_{\Sigma=3.14}O_{8.49}H_{0.88}Cl_{0.67}$.

Occurrence: In a metamorphosed banded Fe–Mn ore deposit in dolostone (Jakobsberg, Sweden).

Association: Plumboferrite, jacobsite, andradite, copper, cuprite, cerussite, calcite (Jakobsberg, Sweden); copper, jacobsite, hematite, damaraite (Kombat mine, Namibia).

Distribution: From Jakobsberg and Långban, Värmland, Sweden. From Reichelsdorf, Hesse, Germany, in slag. In the Kombat Cu–Pb–Ag mine, 49 km south of Tsumeb, Namibia.

Name: From the Greek for *blood* and *visible*, presumably for the blood-red color exhibited in transmitted light.

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

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 728–729. (2) Rouse, R.C. (1973) Hematophanite, a derivative of the perovskite structure. Mineral. Mag., 39, 49–53. (3) Pannetier, J. and P. Batail (1981) $Pb_4Fe_3O_8Cl$: synthesis, crystal structure, and thermal expansion. J. Solid State Chem., 39, 15–21.

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