

Crystal Data: Cubic, typically with a tetragonal supercell. *Point Group:* n.d. Rarely as minute octahedral crystals, or acicular overgrowths; commonly as coatings on or replacements of magnetite; massive.

Physical Properties: Hardness = 5 VHN = 920 D(meas.) = n.d. D(calc.) = 4.860 (synthetic). Strongly magnetic.

Optical Properties: Opaque, transparent in thin fragments. *Color:* Brown, bluish black; brown to yellow in transmitted light; white to bluish gray in reflected light. *Streak:* Brown. *Optical Class:* Isotropic.
R: (400) 31.5, (420) 30.2, (440) 25.8, (460) 27.6, (480) 26.6, (500) 26.0, (520) 25.5, (540) 24.8, (560) 24.0, (580) 23.2, (600) 22.4, (620) 22.0, (640) 21.6, (660) 21.2, (680) 20.8, (700) 20.4

Cell Data: *Space Group:* $P4_132$ or $P4_332$ (synthetic), with $a = 8.3515(22)$ $Z = 8$ (for Fe_{2.67}O₄), or *Space Group:* $P4_1$ or $P4_3$ (synthetic), with $a = 8.35$ $c = 24.99$ $Z = 32$

X-ray Powder Pattern: Synthetic; cubic.
2.5177 (100), 2.953 (35), 1.4758 (34), 1.6073 (24), 2.0886 (16), 1.7045 (10), 1.0872 (7)

Chemistry:

	(1)
SiO ₂	0.3
TiO ₂	13.0
MnO ₂	0.9
Al ₂ O ₃	1.8
Fe ₂ O ₃	74.6
MgO	8.4
Total	99.0

(1) Patos de Minas, Brazil; by electron microprobe, average of 28 analyses on 16 grains, total Fe as Fe₂O₃, total Mn as MnO₂; stated to correspond to (Fe_{0.88}Mg_{0.11}Si_{0.01})_{Σ=1.00}(Fe_{0.96}Ti_{0.32}Mg_{0.30}Al_{0.07}[Cr_{0.03}Mn_{0.02}])_{Σ=1.70}O₄.

Polymorphism & Series: Dimorphous with hematite.

Occurrence: Formed by weathering or low-temperature oxidation of spinels containing ferrous iron, commonly magnetite or titanian magnetite. A widespread yellow pigment in continental sediments, rocks, and soils.

Association: Magnetite, ilmenite, anatase, pyrite, marcasite, lepidocrocite, goethite.

Distribution: Studied material from: the Bushveld complex, Transvaal, South Africa. In the USA, at the Iron Mountain mine, near Redding, Shasta Co., California. In Canada, from the Wabush Iron Formation, Labrador City, Labrador, Newfoundland; in the Steep Rock Lake iron deposits, Ontario; at the Baffinland Iron Mines, northern Baffin Island; and elsewhere. From north of Patos de Minas, Minas Gerais, Brazil. In the Hatrurim Formation, Israel. On the Katzenbuckel, Odenwald, Baden-Württemberg, Germany. In Japan, from the Takanokura mine, Fukushima Prefecture; the Ohinata mine, Nagano Prefecture; and the Kumano mine, Yamaguchi Prefecture. Much more widespread than these localities indicate.

Name: From MAGnetite and HEMatite, in allusion to the mineral's magnetism and composition.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 708–709. (2) McLeod, C.R. (1970) Some Canadian occurrences of maghemite. Geol. Surv. Canada, Paper 70-7, 13 pp. (3) Collyer, S., N.W. Grimes, D.J. Vaughan, and G. Longworth (1988) Studies of the crystal structure and crystal chemistry of titanomaghemite. Amer. Mineral., 73, 153–160. (4) Schulz, D.L. and G.J. McCarthy (1988) X-ray powder data for an industrial maghemite (γ -Fe₂O₃). Powder Diffraction, 3, 104–105. (5) Fabris, J.D., J.M.D. Coey, Q. Qi, and W.N. Mussel (1995) Characterization of Mg-rich maghemite from tuffite. Amer. Mineral., 80, 664–669.

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