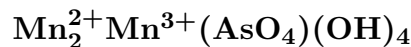


Flinkite



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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Rarely as individual crystals, to 3 mm, bladed, thin tabular {001}, elongated along [010], showing forms {001}, {010}, {110}, {101}, {111}; typically rounded in the zone [100], with {001} striated || [100]. Commonly as rosettes or featherlike aggregates.

Physical Properties: *Tenacity:* Brittle. Hardness = 4.5 D(meas.) = 3.87 D(calc.) = 3.73

Optical Properties: Transparent. *Color:* Greenish brown, dark green, dark yellow-brown; brownish yellowish green in transmitted light. *Luster:* Vitreous, resinous to somewhat greasy. *Optical Class:* Biaxial (+). *Pleochroism:* X = pale brownish green; Y = yellow-green; Z = orange-brown. *Orientation:* X = b; Y = c; Z = a. *Dispersion:* $r > v$, weak. $\alpha = 1.783(3)$ $\beta = 1.801(3)$ $\gamma = 1.834(3)$ 2V(meas.) = Large.

Cell Data: *Space Group:* $Pnma$. $a = 9.55$ $b = 13.11$ $c = 5.25$ $Z = 4$

X-ray Powder Pattern: Harstigen mine, Sweden.

4.733 (100), 4.386 (100b), 2.662 (100), 3.179 (80), 3.815 (30), 2.506 (30), 1.538 (20)

Chemistry:

	(1)	(2)	(3)
As ₂ O ₅	29.1	29.3	30.91
Sb ₂ O ₅	2.5		
Fe ₂ O ₃		0.4	
(Fe, Al) ₂ O ₃	1.5		
Al ₂ O ₃		0.8	
Mn ₂ O ₃	20.2	22.4	21.23
MnO	35.8	33.9	38.17
ZnO		0.6	
MgO	1.7	3.2	
CaO	0.4	0.3	
H ₂ O	9.9	[9.1]	9.69
Total	101.1	[100.0]	100.00

(1) Harstigen mine, Sweden; corresponds to $(\text{Mn}_{1.85}^{2+}\text{Mg}_{0.15}\text{Ca}_{0.03})_{\Sigma=2.03}[\text{Mn}_{0.93}^{3+}(\text{Fe, Al})_{0.08}]_{\Sigma=1.01}[(\text{As}_{0.94}\text{Sb}_{0.05})_{\Sigma=0.99}\text{O}_4](\text{OH})_{4.01}$. (2) Franklin, New Jersey, USA; by electron microprobe, total Fe as Fe₂O₃, Mn²⁺:Mn³⁺ from stoichiometry, H₂O by difference. (3) $\text{Mn}_2^{2+}\text{Mn}^{3+}(\text{AsO}_4)(\text{OH})_4$.

Occurrence: Very rare, in veinlets in magnetite ore (Harstigen mine, Sweden); in a metamorphosed stratiform zinc orebody (Franklin, New Jersey, USA).

Association: Sarkinite, brandtite, caryopilite, nadorite, lead, manganoan calcite, barite (Harstigen mine, Sweden); cahnite, jarosewichite, franklinite, hausmannite, andradite (Franklin, New Jersey, USA).

Distribution: From the Harstigen mine, near Persberg, and at Långban, Värmland, Sweden. At Franklin, Sussex Co., New Jersey, USA.

Name: To honor Gustav Flink (1849–1931), Swedish mineralogist and collector.

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

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 793–794. (2) Culver, K.B. and L.G. Berry (1963) Flinkite and atelestite. Can. Mineral., 7, 547–553. (3) Moore, P.B. (1967) Crystal chemistry of the basic manganese arsenate minerals 1. The crystal structures of flinkite, $\text{Mn}_2^{2+}\text{Mn}^{3+}(\text{OH})_4(\text{AsO}_4)$ and retzian, $\text{Mn}_2^{2+}\text{Y}^{3+}(\text{OH})_4(\text{AsO}_4)$. Amer. Mineral., 52, 1603–1613. (4) Dunn, P.J. (1995) Franklin and Sterling Hill, New Jersey. No publisher, n.p., 654, 668.

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