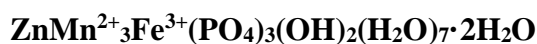


Manganflurlite

Crystal Data: Monoclinic. *Point Group:* $2/m$. As random “jackstraw” aggregates or divergent fans of long, very thin, rectangular laths, to 0.5 mm. Laths are elongated along [100], flattened on {001}, and exhibit {100}, {010}, and {001}.

Physical Properties: *Cleavage:* Perfect on {001}, good on {100} and {010}. *Tenacity:* Flexible and elastic. *Fracture:* Irregular. Hardness = ~2.5 D(meas.) = 2.73(2) D(calc.) = 2.737 Dissolves rapidly in dilute HCl.

Optical Properties: Transparent. *Color:* Orange-brown. *Streak:* Buff. *Luster:* Vitreous iridescent. *Optical Class:* Biaxial (-). $\alpha = 1.623(\text{calc})$ $\beta = 1.649(2)$ $\gamma = 1.673(2)$ $2V(\text{meas.}) = 86(1)^\circ$ *Orientation:* $X = c, Y = b, Z = a$. *Dispersion:* $r > v$, slight. *Pleochroism:* $X = \text{pale yellow brown}, Y = \text{orange-brown}, Z = \text{light yellow brown}$. *Absorption:* $Y > Z > X$.

Cell Data: *Space Group:* $P2_1/m$. $a = 6.4546(8)$ $b = 11.1502(9)$ $c = 13.1630(10)$ $\beta = 99.829(5)^\circ$ $Z = 2$

X-ray Powder Pattern: Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, Germany. 12.89 (100), 2.776 (95), 8.43 (38), 3.206 (29), 5.57 (28), 2.713 (27), 4.241 (26)

Chemistry:	(1)	(2)
MgO	0.39	0.28
CaO	0.02	0.04
MnO	13.54	14.20
ZnO	17.29	13.68
FeO	[6.26]	[9.78]
Fe ₂ O ₃	[9.57]	[10.05]
Al ₂ O ₃	0.32	0.20
P ₂ O ₅	26.85	27.61
H ₂ O	[22.79]	[23.48]
Total	97.03	99.32

(1) Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, Germany; average electron microprobe analysis, H₂O calculated from structure, total iron as Fe₂O₃ (16.52) apportioned from structural data; corresponds to $Zn(Mn^{2+}_{1.51}Fe^{2+}_{0.69}Zn_{0.68}Mg_{0.08})_{\Sigma=2.96}(Fe^{3+}_{0.95}Al_{0.05})_{\Sigma=1.00}(PO_4)_3(OH)_{1.92}(H_2O)_{9.08}$.

(2) Do.; average electron microprobe analysis, H₂O calculated from structure, total iron as Fe₂O₃ (20.92) apportioned from structural data; corresponds to $Zn(Mn^{2+}_{1.54}Fe^{2+}_{1.05}Zn_{0.30}Mg_{0.05})_{\Sigma=2.95}(Fe^{3+}_{0.97}Al_{0.03})_{\Sigma=1.00}(PO_4)_3(OH)_{1.88}(H_2O)_{9.12}$.

Occurrence: A late-stage, relatively low-temperature, secondary hydrothermal mineral in a zoned granitic pegmatite.

Association: Phosphophyllite, hydroxylapatite, jahnsite-(CaMnFe), apatite, mitridatite Zn-bearing rockbridgeite.

Distribution: On two specimens of phosphophyllite from the Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, Germany.

Name: The prefix, *mangan*, indicates the Mn-analog of *flurlite*.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (66682 and 66731).

References: (1) Kampf, A.R., I.E. Grey, C.M. Macrae, and E. Keck (2019) Manganflurlite, $ZnMn^{2+}_3Fe^{3+}(PO_4)_3(OH)_2(H_2O)_7 \cdot 2H_2O$, a new schoonerite-related mineral from the Hagendorf-Süd pegmatite. *Eur. J. Mineral.*, 31(1), 127-134. (2) (2021) *Amer. Mineral.*, 106, 1360-1361 (abs. ref. 1).