Wildenauerite $Zn(Fe^{3+}_{0.5}Mn^{2+}_{0.5})_2Mn^{2+}Fe^{3+}(PO_4)_3(OH)_3(H_2O)_8$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As dense narrow bands of laminated platy crystals, as terminations of rockbridgeite in radial sprays.

Physical Properties: *Cleavage*: Perfect on {010}. *Tenacity*: Brittle. *Fracture*: n.d. Hardness = n.d. D(meas.) = 2.79(1) D(calc.) = 2.76

Optical Properties: [Translucent.] *Color*: Orange to red-brown. *Streak*: n.d. *Luster*: Pearly. *Optical Class*: Biaxial (+). $\alpha = 1.659(3)$ $\beta = 1.687(3)$ $\gamma = 1.742(3)$ 2V(meas.) = 73(1)° 2V(calc.) = 73° *Pleochroism*: *X* = light red-brown, *Y* = medium red-brown, Z = dark red-brown. *Absorption*: *X* < *Y* < *Z*. *Orientation*: *X* = *b*, *Y* = *c*, *Z* = *a*. *Dispersion*: Strong, *r* > *v*.

Cell Data: *Space Group*: *Pmab*. $a = 11.082(1)$ $b = 25.498(2)$ $c = 6.436(1)$ Z = 4

X-Ray Diffraction Pattern: Hagendorf-Süd pegmatite, Hagendorf, Oberpfalz, Bavaria, Germany. 2.767 (100), 12.77 (63), 3.180 (22), 8.368 (21), 5.440 (17), 5.529 (15), 3.760 (15)

Chemistry:

	(1)
FeO	0.7
MgO	0.3
Fe_2O_3	25.2
MnO	10.7
ZnO	11.5
P_2O_5	27.2
H_2O	24.5
Total	100.1

(1) Hagendorf-Süd pegmatite, Hagendorf, Oberpfalz, Bavaria, Germany; average electron microprobe analysis, H_2O by TGA and FeO/Fe_2O_3 from Mössbauer spectroscopy; corresponding to $Zn_{1.11}Mn^{2+}_{1.18}Mg_{0.05}Fe^{2+}_{0.08}Fe^{3+}_{2.47}(PO_4)_3(OH)_{3.25}(H_2O)_{9.03}$.

Mineral Group: Schoonerite group. $M1 = M2 = (Fe^{3+}_{0.5}Mn^{2+}_{0.5})$ and $M3 = Mn^{2+}$.

Occurrence: 'Fingers' of porous wildenauerite penetrate into rockbridgeite from its surface, as an oxidation product of a precursor, green, mixed-valence iron-bearing species in granitic pegmatite.

Association: Jahnsite-(CaMnFe), strunzite, whitmoreite/earlshannonite, laueite, Zn-bearing rockbridgeite.

Distribution: From the Hagendorf-Süd pegmatite, Hagendorf, Oberpfalz, Bavaria, Germany.

Name: From the old name for the Hagendorf-Süd quarry, *Wildenauer*-Grube, named for the mining family, Wildenauer, and their long-time activities in feldspar mining at the Hagendorf Süd pegmatite.

Type Material: Museums Victoria, Melbourne, Victoria, Australia (M53979).

References: (1) Grey, I.E., E. Keck, A.R. Kampf, J.D. Cashion, C.M. MacRae, and A.M. Glenn (2019) Schmidite and wildenauerite, two new schoonerite-group minerals from the Hagendorf-Süd pegmatite, Oberpfalz, Bavaria. Mineral. Mag., 83, 181-190. (2) Grey, I.E., A.R. Kampf, E. Keck, C.M. MacRae, J.D. Cashion, and Y. Gozukara (2018) Crystal chemistry of schoonerite-group minerals. Eur. J. Mineral., 30, 621-634.