Zincostrunzite $ZnFe^{3+}_2(PO_4)_2(OH)_2 \cdot 6.5H_2O$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. Prismatic crystals display {010} and {1$\bar{1}$ 0} in bundles to 2 mm or as needles to ~ 5 mm, elongated on [001] and with poorly formed terminations, probably {001}. As rims on strunzite crystals. *Twinning*: Ubiquitous by 180° rotation on [010].

Physical Properties: *Cleavage*: Perfect ‖ [001], probably either on {1$\bar{1}$ 0} or {100}.
Tenacity: Brittle. *Fracture*: Irregular, splintery. Hardness = 2.5 D(meas.) = 2.66(1)
D(calc.) = 2.679 Dissolves slowly in dilute HCl.

Optical Properties: Transparent. *Color*: Light brownish yellow to silvery white. *Streak*: White.
Luster: Vitreous to silky.
Optical Class: Biaxial (-). α = 1.620(2) β = 1.672(2) γ = 1.720(2) 2V(meas.) = 89.5(5)°
2V(calc.) = 85.1° *Orientation*: $Z \wedge c = 3°$, $X \approx a^*$. *Pleochroism*: *X* = nearly colorless, *Y* = light brownish yellow, *Z* = darker brownish yellow. *Absorption*: $X < Y < Z$.

Cell Data: *Space Group*: $P\bar{1}$. a = 10.1736(6) b = 9.7999(5) c = 7.3296(2) α = 91.325(4)°
β = 97.895(6)° γ = 116.948(4)° Z = 2

X-ray Powder Pattern: Sitio do Castelo mine, Folgosinho, Gouveia, Guarda District, Portugal.
8.87 (100), 5.32 (95), 3.220 (75), 4.287 (41), 1.6222 (32), 4.457 (30), 3.310 (29)

Chemistry:	(1)	(2)	(3)
ZnO	12.07	15.13	15.71
MnO	3.28	3.74	
Fe_2O_3	32.00	29.23	30.82
P_2O_5	28.53	28.24	27.40
H_2O	[27.30]	[27.02]	26.08
Total	103.18	103.39	100.00

(1) Sitio do Castelo mine, Portugal; average of 9 electron microprobe analyses, H_2O calculated from structural analysis; corresponds to $(Zn_{0.74}Mn^{2+}_{0.23})_{\Sigma=0.97}Fe^{3+}_{1.99}(PO_4)_2(OH)_2 \cdot 6.5H_2O$. (2) Hagendorf South, Bavaria, Germany; average of 4 electron microprobe analyses, H_2O calculated from structural analysis; corresponds to $(Zn_{0.93}Mn^{2+}_{0.08})_{\Sigma=1.01}(Fe^{3+}_{1.84}Mn^{2+}_{0.19})_{\Sigma=2.03}(PO_4)_2(OH)_2 \cdot 6.5H_2O$.
(3) $ZnFe^{3+}_2(PO_4)_2(OH)_2 \cdot 6.5H_2O$.

Occurrence: In zoned phosphatic granitic pegmatite (Hagendorf). In vugs in a secondary phosphate assemblage from altered triplite-zwieselite in wolframite-bearing quartz lens (Sitio do Castelo).

Association: Triplite-zwieselite, fluorapatite, cryptomelane, cacoxenite, plimerite, strengite, strunzite, isokite (Sitio do Castelo); in a former triphylite nodule replaced by phosphophyllite and apatite (Hagendorf).

Distribution: From the 67-meter level, Cornelia Mine Open Cut, Hagendorf South, Oberpfalz, Bavaria, Germany. From the Sitio do Castelo mine, Folgosinho, Gouveia, Guarda District, Portugal.

Name: As the Zn analogue of *strunzite*.

Type Material: Mineral Sciences Department, Natural History Museum of Los Angeles County, Los Angeles, CA, USA (65646 and 65647) and the Geosciences Collection, Museum Victoria, Melbourne, Victoria, Australia (M53585).

References: (1) Kampf, A.R., I.E. Grey, P. Alves, S.J. Mills, B.P. Nash, C.M. MacRae, and E. Keck (2017) Zincostrunzite, $ZnFe^{3+}_2(PO_4)_2(OH)_2 \cdot 6.5H_2O$, a new mineral from the Sitio do Castelo mine, Portugal, and the Hagendorf-Süd pegmatite, Germany. Eur. J. Mineral., 29(2), 315-322. (2) (2018) Amer. Mineral., 103, 663 (abs. ref. 1).