Zincoberaunite $ZnFe^{3+}_5(PO_4)_4(OH)_5 \cdot 6H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As radial or randomly oriented aggregates of fibers to 1.5 mm, elongated along [010] and somewhat flattened on {100}.

Physical Properties: *Cleavage*: {100}, good. *Tenacity*: Brittle. *Fracture*: Splintery. Hardness = n.d. D(meas.) = n.d. D(calc.) = 2.92

Optical Properties: Translucent. *Color*: Pale gray to silvery white. *Streak*: n.d. *Luster*: Silky. *Optical Class*: Biaxial (-). $\alpha = 1.745(5)$ $\beta = 1.760(5)$ $\gamma = 1.770(5)$ 2V(meas.) = 80(5)° 2V(calc.) = 78° *Dispersion*: Distinct, $r < v$. *Orientation*: $Y = b$, $Z \approx c$. *Pleochroism*: Distinct, $X = Y$ = pale beige, Z = light orange-brown. *Absorption*: $X = Y < Z$.

Cell Data: *Space Group*: *C*2/*c*. $a = 20.837(2)$ $b = 5.1624(4)$ $c = 19.250(1)$ $\beta = 93.252(5)°$ Z = 4

X-ray Powder Pattern: Hagendorf South pegmatite, Bavaria, Germany.
10.37 (100), 3.079 (33), 9.58 (32), 7.24 (26), 4.817 (22), 3.194 (15), 3.483 (14)

Chemistry:	(1)	(2)
MgO	0.28	
CaO	0.47	
ZnO	7.36	8.87
Al_2O_3	0.88	
Fe_2O_3	42.42	43.50
P_2O_5	31.63	30.94
H_2O	16.2(5)	16.69
Total	99.24	100.00

(1) Hagendorf South pegmatite, Bavaria, Germany; average of 5 electron microprobe analyses supplemented by IR spectroscopy, H_2O by gas chromatography; corresponds to $(Zn_{0.83}Ca_{0.08}Mg_{0.06})_{\Sigma=0.97}(Fe^{3+}_{4.88}Al_{0.16})_{\Sigma=5.04}(PO_4)_{4.09}(OH)_{4.78} \cdot 5.86H_2O$. (2) $ZnFe^{3+}_5(PO_4)_4(OH)_5 \cdot 6H_2O$.

Mineral Group: Beraunite group.

Occurrence: In a zoned phosphatic granitic pegmatite.

Association: Potassium feldspar, quartz, jungite, phosphophyllite, mitridatite; or flurlite, plimerite, Zn-bearing beraunite, schoonerite, parascholzite/scholzite, robertsite, altered phosphophyllite.

Distribution: From the Cornelia Mine Open Cut, Hagendorf South pegmatite, Upper Palatinate, Bavaria, Germany.

Name: As the analogue of *beraunite* with zinc dominant among essential bivalent cations.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (4828/1) and Museum Victoria, Melbourne, Victoria, Australia (M53238).

References: (1) Chukanov, N.V., I.V. Pekov, I.E. Grey, J.R. Price, S.N. Britvin, M.G. Krzhizhanovskaya, A.R. Kampf, B. Dünkel, E. Keck, D.I. Belakovskiy, and C.M. MacRae (2017) Zincoberaunite, $ZnFe^{3+}_5(PO_4)_4(OH)_5 \cdot 6H_2O$, a new mineral from the Hagendorf South pegmatite, Germany. Mineralogy and Petrology, 111(3), 351-361. (2) (2018) Amer. Mineral., 103, 662-663 (abs. ref. 1).