Wilhelmvierlingite $CaMn^{2+}Fe^{3+}(PO_4)_2(OH)\cdot 2H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As prismatic to equant crystals, showing {100}, {010}, {110}, {001}, to 40μm, typically in radial fibrous aggregates.

Physical Properties: *Cleavage:* On {010}, perfect. Hardness = 4 D(meas.) = 2.58 D(calc.) = 2.60

Optical Properties: Translucent. *Color:* Yellow to brownish yellow. *Streak:* Pale yellow. *Luster:* Vitreous.
Optical Class: Biaxial (–) or (+). *Pleochroism:* $X = Y$ = light yellow; Z = dark yellow. *Orientation:* $X = b$; $Y = a$; $Z = c$. $\alpha = 1.637$ $\beta = 1.664$ $\gamma = 1.692$ 2V(meas.) = n.d. 2V(calc.) = 45°

Cell Data: *Space Group: Pbca.* $a = 14.80(5)$ $b = 18.70(5)$ $c = 7.31(2)$ Z = 8

X-ray Powder Pattern: Hagendorf, Germany.
2.86 (10), 9.34 (7), 5.00 (6d), 1.98 (5), 4.67 (4), 2.58 (4), 1.96 (4d)

Chemistry:

	(1)	(2)
P_2O_5	35.5	36.04
Fe_2O_3	19.0	20.27
MnO	17.6	18.01
ZnO	2.6	
CaO	11.9	14.24
H_2O	[13.4]	11.44
Total	[100.0]	100.00

(1) Hagendorf, Germany; by electron microprobe, originally given as PO_4 47.5%, Fe 13.3%, Mn 13.6%, Zn 2.1%, Ca 8.5%, H_2O 15.0% by difference, total 100.0%, here converted to oxides, total Fe as Fe_2O_3, total Mn as MnO, $(OH)^{1-}$ determined present by IR; stated to correspond to $(Ca_{0.85}Zn_{0.13})_{\Sigma=0.98}Mn^{2+}_{0.99}Fe^{3+}_{0.95}(PO_4)_2(OH)\cdot 2.33H_2O$. (2) $CaMn^{2+}Fe^{3+}(PO_4)_2(OH)\cdot 2H_2O$.

Mineral Group: Overite group.

Occurrence: A rare secondary mineral in a complex zoned granite pegmatite.

Association: Rockbridgeite, zwieselite.

Distribution: From Hagendorf, Bavaria, Germany.

Name: To honor Wilhelm Vierling (1901–1995), Weiden, Germany, a longtime student of Hagendorf minerals.

Type Material: Institute for Mineralogy and Crystallography, Technical University, Berlin, Germany.

References: (1) Mücke, A. (1983) Wilhelmvierlingit, $(Ca,Zn)MnFe^{3+}[OH|(PO_4)_2]2H_2O$, ein neues Mineral von Hagendorf/Oberpfalz. Aufschluss, 34, 267–274 (in German). (2) (1984) Amer. Mineral., 69, 568 (abs. ref. 1).