Walentaite $\mathbf{H(Ca,Fe^{2+},Mn^{2+})Fe_3^{3+}(AsO_4,PO_4)_4 \cdot 7H_2O}$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$, $mm2$, or 222. Bladed crystals, to 200 μm, elongated along [001] and flattened on {010}, typically in aggregates of rosettes.

Physical Properties: *Cleavage:* Perfect on {010}. *Tenacity:* Brittle. Hardness = ~3 D(meas.) = 2.72 D(calc.) = 2.72

Optical Properties: Semitransparent. *Color:* Bright yellow, bright greenish yellow, pale brownish in aggregates. *Streak:* Pale yellow. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Pleochroism:* Weak; X = colorless; Y = pale yellow-green to pale yellow; Z = medium yellow-green to medium yellow. *Orientation:* $X = b$; $Y = a$; $Z = c$. *Absorption:* $Z < Y$. α = 1.65–1.738 β = [1.707]–1.74 γ = 1.76–1.779 2V(meas.) = n.d.

Cell Data: *Space Group:* $Immm$, $Imam$, $Imm2$, $Ima2$, $I222$, or $I2_12_12_1$. a = 26.24(6) b = 10.31(1) c = 7.38(1) Z = 1

X-ray Powder Pattern: White Elephant mine, South Dakota, USA.
12.9 (100), 3.00 (50), 4.43 (30), 6.56 (20), 4.82 (20), 2.931 (20), 2.776 (20)

Chemistry:

	(1)	(2)		(1)	(2)
WO_3		14.5	FeO	3.2	
P_2O_5	12.5	16.5	MnO	3.1	
As_2O_5	32.9	24.9	CaO	2.9	2.3
Al_2O_3	0.5		F	trace	
Fe_2O_3	28.3	25.3	H_2O	16.6	[16.5]
			Total	[100.0]	[100.0]

(1) White Elephant mine, South Dakota, USA; by electron microprobe, Fe^{2+}:Fe^{3+} from stoichiometry, total Mn as MnO, H_2O by TGA-EGA, normalized to 100% from an original total of 111.2%; corresponding then to $H_{0.12}(Ca_{0.42}Fe^{2+}_{0.37}Mn_{0.36})_{\Sigma=1.15}(Fe^{3+}_{2.92}Al_{0.08})_{\Sigma=3.00}[(AsO_4)_{2.36}(PO_4)_{1.45}]_{\Sigma=3.81} \cdot 7.52H_2O$. (2) Griffin's Find mine, Australia; by electron microprobe, total Fe as Fe_2O_3, H_2O by difference; with $(OH)^{1-}$ calculated for charge balance, corresponding to $Ca_{0.36}Fe^{3+}_{2.82}W_{0.56}[(AsO_4)_{1.94}(PO_4)_{2.06}]_{\Sigma=4.00}(OH)_{0.54} \cdot 7.92H_2O$.

Occurrence: A rare secondary mineral in a complex zoned pegmatite, probably formed by alteration of löllingite and triphylite–lithiophilite (White Elephant mine, South Dakota, USA); a secondary mineral in the oxidized zone of a gold mine in granulite (Griffin's Find mine, Australia).

Association: Rockbridgeite, löllingite, spessartine, muscovite, quartz, tridymite (White Elephant mine, South Dakota, USA); pharmacosiderite, jarosite, iron oxides (Griffin's Find mine, Australia).

Distribution: From the White Elephant mine, near Pringle, Custer Co., South Dakota, USA. In the Griffin's Find gold mine, about 15 km northwest of Lake Grace, Western Australia.

Name: Honoring Dr. Kurt Walenta (1927–), Professor of Mineralogy, University of Stuttgart, Stuttgart, Germany, for his contributions to the mineralogy of arsenates and phosphates, especially from the Black Forest, Germany.

Type Material: The Natural History Museum, London, England, 1984,690; National Museum of Natural History, Washington, D.C., USA, 149782, 149783.

References: (1) Dunn, P.J., D.R. Peacor, W.L. Roberts, T.J. Campbell, and R.A. Ramik (1984) Walentaite, a new calcium iron arsenate phosphate from the White Elephant mine, Pringle, South Dakota. Neues Jahrb. Mineral., Monatsh., 169–174. (2) (1984) Amer. Mineral., 69, 1193–1194 (abs. ref. 1). (3) Nickel, E.H. (1987) Tungsten-bearing walentaite from Griffins Find gold deposit, Western Australia. Australian Mineral., 2(1), 9–12.