Falsterite $Ca_2MgMn^{2+}_2(Fe^{2+}_{0.5}Fe^{3+}_{0.5})_4Zn_4(PO_4)_8(OH)_4(H_2O)_{14}$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As plates and rectangular laths, to 0.7 mm, flattened on {010}, elongate along [100]. *Twinning*: Lamellar, common.

Physical Properties: *Cleavage:* Perfect on {010}. *Fracture*: Irregular. *Tenacity*: Flexible. Hardness = 2 D(meas.) = 2.78(3) D(calc.) = 2.837 Dissolves in HCl.

Optical Properties: Transparent. *Color*: Greenish blue. *Streak*: Pale greenish blue. *Luster*: Vitreous.
Optical Class: Biaxial (-). α = 1.575(10) β = 1.600(5) γ = 1.610(5) 2V(meas.) = 60(10)° 2V(calc.) = 63.8° *Dispersion*: $r > v$, strong. *Orientation*: $X = b$, $Y \approx a$, $Z \approx c$.
Pleochroism: Pronounced; $X = Z$ = colorless to very pale yellow, Y = blue-green.
Absorption: $Y >> X \approx Z$.

Cell Data: *Space Group*: $P2_1/c$. a = 6.3868(18) b = 21.260(7) c = 15.365(5) β = 90.564(6)° Z = 2

X-ray Powder Pattern: Palermo No. 1 pegmatite, North Groton, New Hampshire, USA.
10.675 (100), 12.86 (34), 3.220 (25), 2.846 (19), 4.043 (18), 3.107 (14), 1.596 (14)

Chemistry:	(1)	(2)
CaO	6.36	6.30
MgO	2.13	2.27
MnO	8.10	7.97
ZnO	18.49	18.30
FeO	8.02	8.08
Fe_2O_3	8.90	8.98
Al_2O_3	0.02	
P_2O_5	31.81	31.91
H_2O	16.17	16.20
Total	100.00	100.00

(1) Palermo No. 1 pegmatite, North Groton, New Hampshire, USA; average of 7 electron microprobe analyses, H_2O calculated from stoichiometry, FeO/Fe_2O_3 apportioned from structure analysis; corresponds to $Ca_{2.02}Mg_{0.94}Mn^{2+}_{2.04}Fe^{2+}_{1.99}Fe^{3+}_{1.99}Zn_{4.05}P_{7.99}O_{32}(OH)_4(H_2O)_{14}$.
(2) $Ca_2MgMn^{2+}_2(Fe^{2+}_{0.5}Fe^{3+}_{0.5})_4Zn_4(PO_4)_8(OH)_4(H_2O)_{14}$.

Occurrence: Formed as the result of secondary alteration of primary triphylite and associated sphalerite in the core-margin of a well-zoned beryl-phosphate granitic pegmatite.

Association: Messelite, mitridatite, phosphophyllite, quartz, schoonerite, siderite, smithsonite, vivianite (Palermo No 1); almandine, fairfieldite, muscovite, quartz, schoonerite, sphalerite (Estes).

Distribution: From the Palermo No. 1 pegmatite, North Groton, Grafton County, New Hampshire and the Estes pegmatite quarry, Baldwin, Cumberland County, Maine, USA.

Name: Honors Alexander U. Falster (b. 1952), a Scientific Research Technologist, Department of Earth and Environmental Science, University of New Orleans, Louisiana, USA, in recognition for his research on pegmatites and pegmatite minerals.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (63565-63568).

References: (1) Kampf, A.R., S.J. Mills, W.B. Simmons, J.W. Nizamoff, and R.W. Whitmore (2012) Falsterite, $Ca_2MgMn^{2+}_2(Fe^{2+}_{0.5}Fe^{3+}_{0.5})_4Zn_4(PO_4)_8(OH)_4(H_2O)_{14}$, a new secondary phosphate mineral from the Palermo No. 1 pegmatite, North Groton, New Hampshire. Amer. Mineral., 97, 496-502.