Farringtonite $Mg_3(PO_4)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Subhedral to euhedral grains, to 2 mm, and as rims on olivine.

Physical Properties: *Cleavage:* {100} and {010}, fair to good. Hardness = n.d. D(meas.) = ∼2.80 D(calc.) = 2.76

Optical Properties: Transparent to opaque. *Color:* Colorless, white, yellow, dark amber. *Optical Class:* Biaxial (+). *Orientation:* $Z \wedge c = 16°–17°$. $\alpha = 1.540(2)$ $\beta = 1.544(2)$ $\gamma = 1.559(2)$ 2V(meas.) = 47°–55°

Cell Data: *Space Group:* $P2_1/a$. $a = 8.79(1)$ $b = 8.22(2)$ $c = 5.07(1)$ $\beta = 120.5(5)°$ Z = 2

X-ray Powder Pattern: Springwater meteorite.
3.443 (100), 3.85 (67), 2.411 (48), 4.09 (40), 4.34 (38), 3.65 (37), 2.122 (33)

Chemistry:

	(1)	(2)	(3)
P_2O_5	53.2	53.9	54.00
SiO_2	0.09	0.07	
FeO	4.1	2.7	
MnO	0.19	0.13	
MgO	43.1	44.9	46.00
CaO	0.07	0.08	
Total	100.8	101.8	100.00

(1) Springwater meteorite; by electron microprobe, average of six grains, total Fe and Mn as FeO and MnO; corresponding to $(Mg_{2.84}Fe_{0.15}Mn_{0.01})_{\Sigma=3.00}(PO_4)_2$. (2) Krasnojarsk meteorite; by electron microprobe, average of six grains, total Fe and Mn as FeO and MnO; corresponding to $(Mg_{2.92}Fe_{0.10}Mn_{0.01})_{\Sigma=3.03}(PO_4)_2$. (3) $Mg_3(PO_4)_2$.

Occurrence: A rare component in pallasite meteorites, rimming and cementing olivine nodules.

Association: Olivine, stanfieldite, troilite, schreibersite, kamacite.

Distribution: In the Springwater, Krasnojarsk, Zaisho, Imilac, and Port Orford pallasite meteorites.

Name: To honor Dr. Oliver Cummings Farrington (1864–1933), Curator of Geology, Field Museum of Natural History, Chicago, Illinois, USA, an authority on meteorites.

Type Material: The Natural History Museum, London, England, 1960,150 and 1960,151.

References: (1) DuFresne, E.R. and S.K. Roy (1961) A new phosphate mineral from the Springwater pallasite. Geochim. Cosmochim. Acta, 24, 198–205. (2) (1961) Amer. Mineral., 46, 1513 (abs. ref. 1). (3) Fuchs, L.H., E. Olsen, and E. Gebert (1973) New X-ray and compositional data for farringtonite, $Mg_3(PO_4)_2$. Amer. Mineral., 58, 949–951. (4) Nord, A.G. (1986) Determination of cation distributions in mineral structures by use of the Rietveld full-profile refinement technique. Chemica Scripta, 26A, 115–118.