Chopinite $Mg_3(PO_4)_2$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As irregular grains to 0.6 mm.

Physical Properties: *Cleavage*: Good on {001} and {100}. *Tenacity*: n.d. *Fracture*: n.d. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.34

Optical Properties: Transparent. *Color*: Colorless. *Streak*: n.d. *Luster*: n.d. *Optical Class*: Biaxial (-). α = 1.595(2) β = 1.648(2) γ = 1.656(2) 2V(meas.) = 40(2)° 2V(calc.) = 41° *Orientation*: *X* // *b*, *Z* ^ *a* ≈ 55°.

Cell Data: *Space Group*: $P2_1/c$. *a* = 5.9305(7) *b* = 4.7583(6) *c* = 10.2566(10) β = 90.663(9)° Z = 2

X-Ray Diffraction Pattern: Brattnevet, Larsemann Hills, Prydz Bay, East Antarctica. 3.84 (100), 2.44 (73), 2.51 (72), 3.48 (52), 2.77 (46), 2.26 (45), 5.92 (42)

Chemistry:

	(1)	(2)
SiO_2	0.32	0.02
P_2O_5	47.32	47.49
Al_2O_3	0.05	0.01
MgO	30.35	25.10
MnO	0.15	3.64
FeO	20.99	23.58
NiO		0.16
CaO	0.35	0.01
F	0.02	
Cl	0.01	.
Total	99.54	100.04

(1) Brattnevet, Larsemann Hills, Prydz Bay, East Antarctica; average electron microprobe analysis; corresponds to $Ca_{0.02}Mg_{2.20}Fe_{0.86}Mn_{0.01}Si_{0.02}P_{1.95}O_8$. (2) Graves Nunataks meteorite; average electron microprobe analysis, total includes $Na_2O + K_2O = 0.04$; corresponds to $Mg_{1.860}Fe_{0.980}Ni_{0.006}Mn_{0.153}Si_{0.001}P_{1.998}O_8$.

Polymorphism & Series: Complete solid solution with sarcopside. Polymorph of farringtonite.

Occurrence: In a granulite facies paragneiss (East Antarctica). In a transitional acapulcoite meteorite affected by shock metamorphism.

Association: Fluorapatite, quartz, wagnerite-*Ma5bc*, xenotime-(Y), stornesite-(Y), P-bearing K-feldspar and plagioclase, Ti-rich biotite, sillimanite, orthopyroxene, sapphirine, hercynite, corundum (Brattnevet); sarcopside, chladniite-johnsomervilleite, farringtonite (Graves Nunataks).

Distribution: From Brattnevet, Larsemann Hills, Prydz Bay, East Antarctica [TL]. In the meteorite Graves Nunataks (GRA) 95209.

Name: Honors Christian *Chopin* (b. 1955) of the Ecole Normale Supérieure, Paris, France, for his contributions to the mineralogy of phosphates.

Type Material: Mineralogy Museum, School of Mines, Paris, France (M 73096).

References: (1) Grew, E.S., T. Armbruster, O. Medenbach, M.G. Yates, and C.J. Carson (2007) Chopinite, $[(Mg,Fe)_3\square](PO_4)_2$, a new mineral isostructural with sarcopside, from fluorapatite segregation in granulite-facies paragneiss, Larsemann Hills, Prydz Bay, East Antarctica. Eur. J. Mineral., 19, 229-245. (2) Grew, E.S., M.G. Yates, R.J. Beane, C. Floss, and C. Gerbi (2010) Chopinite-sarcopside solid solution, $[(Mg,Fe)_3\square](PO_4)_2$, in GRA95209, a transitional acapulcoite; Implications for phosphate genesis in meteorites. Amer. Mineral., 95, 260-272. (3) (2008) Amer. Mineral., 96, 252 (abs. ref. 1).