Matyhite $Ca_9(Ca_{0.5}\square_{0.5})Fe^{2+}(PO_4)_7$

Crystal Data: Hexagonal. *Point Group*: 3*m*. As plate-like crystals to 10 μm; dendritic aggregates.

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: n.d. Hardness = n.d. D(meas.) = n.d. D(calc.) = n.d.

Optical Properties: *Color*: Grayish in transmitted light. *Streak*: n.d. *Luster*: n.d. *Optical Class*: n.d.

Cell Data: *Space Group*: *R*3*c*. a = 10.456 (7) c = 37.408(34) Z = 6

X-ray Powder Pattern: D'Orbigny angrite meteorite (intensities not given). 6.52, 5.24, 3.46, 3.21, 3.02, 2.88, 2.75

Chemistry:

	(1)		(1)
SiO_2	1.39	NiO	0.02
TiO_2	0.07	ZnO	0.05
Al_2O_3	0.09	SrO	0.43
FeO	6.10	La_2O_3	0.08
MnO	0.04	Yb_2O_3	0.15
MgO	0.01	Nd_2O_3	0.18
CaO	47.06	SO_3	0.01
Na_2O	0.15	Ce_2O_3	0.25
K_2O	0.03	Total	99.22
Cr_2O_3	0.01		

(1) D'Orbigny angrite meteorite; average electron microprobe analysis supplemented by Raman spectroscopy; corresponds to $(Ca_{8.91}Sr_{0.05}REE_{0.04})_{\Sigma=9.0}(\square_{0.52}Ca_{0.42}Na_{0.05}K_{0.01})_{\Sigma=1.0}(Fe^{2+}_{0.68}Fe^{3+}_{0.26}Al_{0.02}Ti_{0.01}Mn_{0.01}Zn_{0.01})_{\Sigma=0.99}(P_{6.75}Si_{0.26})_{\Sigma=7.01}O_{28.02}$.

Occurrence: In an angrite meteorite as well-defined domains associated with Fe sulfide near the contact between fayalite-kirschsteinite overgrowth/symplectite and hedenbergite.

Association: Kuratite, ulvöspinel, hedenbergite, Ca and Fe olivine, Fe sulfide.

Distribution: From the D'Orbigny angrite meteorite.

Name: Honors Professor Ting-Ying Hsüeh Ma (1899-1979), a palaeontologist who pioneered research into relations between coral growth rate, sea-water temperature, paleoclimate, and paleogeography. He was an early advocate of continental drift. Joint Director of the Department of Geology and the Institute of Oceanography, National Taiwan University (1946-1950).

Type Material: Natural History Museum, Vienna, Austria (Section D'Orbigny C-N1172-NH Wien) and the National Museum of Natural Science, Taiwan, ROC (NMNS007600-P020440).

References: (1) Hwang, S.L., P. Shen, H.T. Chu, T.F. Yui, M.E. Varela, and Y. Iizuka (2019) New minerals tsangpoite $Ca_5(PO_4)_2(SiO_4)$ and matyhite $Ca_9(Ca_{0.5}\square_{0.5})Fe(PO_4)_7$ from the D'Orbigny angrite. Mineral. Mag., 83, 293-313.