Pieczkaite $Mn_5(PO_4)_3Cl$

Crystal Data: Hexagonal. *Point Group*: 6/*m*. As massive vein fillings and patches to 25 μm.

Physical Properties: *Cleavage*: None. *Fracture*: Irregular. *Tenacity*: Brittle. Hardness = 4-5 D(meas.) = n.d. D(calc.) = 3.783

Optical Properties: Translucent (apparently). *Color*: Gray. *Streak*: Grayish white. *Luster*: n.d. *Optical Class*: Uniaxial (-). ω = 1.696(2) ε = 1.692(2)

Cell Data: Space Group: $P6_3/m$. a = 9.504(4) c = 6.347(3) Z = 2

X-ray Powder Pattern: Pegmatite no. 22, Cross Lake, Manitoba, Canada.
2.794 (100), 2.744 (88), 2.639 (34), 2.514 (25), 1.853 (25), 3.174 (24), 1.902 (21)

Chemistry:

	(1)
P_2O_5	37.52
MnO	41.77
FeO	2.45
CaO	13.78
Cl	3.86
H_2O	[0.60]
$-O = Cl_2$	0.87
Total	99.11

(1) Pegmatite no. 22, Cross Lake, Manitoba, Canada.; average of 7 electron microprobe analyses supplemented by Raman and IR spectroscopy; corresponds to $(Mn_{3.36}Ca_{1.40}Fe_{0.20})_{\Sigma=4.96}(P_{1.01}O_4)_3(Cl_{0.62}OH_{0.38})_{\Sigma=1.00}$.

Mineral Group: Apatite supergroup.

Occurrence: As small patches and narrow veins in apatite and (Mn,Cl)-bearing apatite in phosphate pods in the interior wall zone of the quartz core of a granitic pegmatite.

Association: Fluorapatite, manitobaite, eosphorite, triploidite, quartz.

Distribution: From Pegmatite no. 22, southeastern shoreline of an unnamed island in Cross Lake, Manitoba, Canada.

Name: Honors Adam Pieczka (b. 1957), Assistant Professor, Department of Mineralogy, Petrography, and Geochemistry, Faculty of Geology, Geophysics, and Environmental Protection, Kraków, Poland, for his contributions to the crystal chemistry of pegmatite minerals.

Type Material: Royal Ontario Museum, Toronto, Canada (M56483).

References: (1) Tait, K., N.A. Ball, and F.C. Hawthorne (2015) Pieczkaite, ideally $Mn_5(PO_4)_3Cl$, a new apatite-supergroup mineral from Cross Lake, Manitoba, Canada: Description and crystal structure. Amer. Mineral., 100, 1047-1052.