Mcauslanite $HFe_3^{2+}Al_2(PO_4)_4F \cdot 18H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$ or 1. As clusters of radiating fibrous to bladed crystals, elongated along [001], to 1 mm; dominant forms include {010}, {100}, minor {001}. *Twinning:* By rotation about [100]*, creating suture lines on {010}.

Physical Properties: *Cleavage:* Good ‖ [001]. *Tenacity:* Brittle. Hardness = 3.5 D(meas.) = 2.22(2) D(calc.) = 2.17

Optical Properties: Transparent to translucent. *Color:* Yellowish white. *Streak:* White. *Luster:* Vitreous to silky.
Optical Class: Biaxial (–). *Orientation:* $X \wedge b = 17°$ in β obtuse; $Y \wedge c = 18°$ in α obtuse; $Z \wedge a = 14°$ in γ obtuse. $\alpha = 1.522(1)$ $\beta = 1.531(1)$ $\gamma = 1.534(1)$ 2V(meas.) = 55(5)° 2V(calc.) = 59.7°

Cell Data: *Space Group:* $P\overline{1}$ or $P1$. $a = 10.055(5)$ $b = 11.568(5)$ $c = 6.888(5)$ $\alpha = 105.84(6)°$ $\beta = 93.66(6)°$ $\gamma = 106.47(5)°$ Z = 1

X-ray Powder Pattern: East Kemptville mine, Nova Scotia, Canada.
4.96 (100), 10.6 (90), 9.53 (85), 6.55 (70), 2.812 (55), 2.785 (45), 3.436 (35)

Chemistry:

	(1)	(2)
P_2O_5	30.5	30.02
Al_2O_3	11.1	10.78
FeO	18.1	22.79
MnO	5.0	
F	2.2	2.01
H_2O	34.0	35.25
$-O = F_2$	0.9	0.85
Total	[100.0]	100.00

(1) East Kemptville mine, Nova Scotia, Canada; by electron microprobe, total Fe as FeO, confirmed by microchemical test, original anhydrous total 84.8%, normalized to 100.0% with 34% H_2O by two separate TGA-EGA determinations; then corresponding to $H_{1.02}(Fe_{2.40}Mn_{0.67})_{\Sigma=3.07}Al_{2.08}(PO_4)_{4.10}F_{1.10} \cdot 17.49H_2O$. (2) $HFe_3Al_2(PO_4)_4F \cdot 18H_2O$.

Occurrence: A very rare non-oxidized secondary mineral along joints beneath the erosional surface of a greisen-hosted stockwork tin mine.

Association: Vivianite, phosphophyllite, childrenite–eosphorite.

Distribution: From the East Kemptville tin mine, Yarmouth Co., Nova Scotia, Canada.

Name: Honors Dr. David A. McAuslan (1943–), Exploration Manager for Shell Canada Resources Ltd., developers of the East Kemptville tin mine, Canada.

Type Material: Department of Earth Sciences, Carleton University, Canada, 4427; Canadian Museum of Nature, Ottawa, Canada, 64806; National Museum of Natural History, Washington, D.C., USA, 165484.

References: (1) Richardson, J.M., A.C. Roberts, J.D. Grice, and R.A. Ramik (1988) Mcauslanite, a supergene hydrated iron aluminum fluorophosphate from the East Kemptville tin mine, Yarmouth County, Nova Scotia. Can. Mineral., 26, 917–921. (2) (1990) Amer. Mineral., 75, 707–708 (abs. ref. 1).