Fluckite $CaMn^{2+}(AsO_3OH)_2 \cdot 2H_2O$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Prismatic crystals, to 1.5 mm, elongated along [100] or [010], flattened on {100} or {110}, terminated by large {$2\overline{3}1$}, {$2\overline{3}3$}, with a number of other forms present. Typically radiating to spherulitic.

Physical Properties: *Cleavage:* On {010}, perfect; on {100}, easy; on {$\overline{1}01$}, imperfect and difficult. Hardness = 3.5–4 VHN = 170 (50 g load). D(meas.) = 3.05(2) D(calc.) = 3.11

Optical Properties: Semitransparent. *Color:* Colorless, very pale pink to dark pink with increasing cobalt content.
Optical Class: Biaxial (+), probable. $\alpha = 1.618$ $\beta = 1.627$ $\gamma = 1.642$ 2V(meas.) = Very large.

Cell Data: *Space Group:* $P\overline{1}$. $a = 8.459(2)$ $b = 7.613(1)$ $c = 6.968(1)$ $\alpha = 82.21(1)°$ $\beta = 98.25(1)°$ $\gamma = 95.86(2)°$ Z = 2

X-ray Powder Pattern: Gabe-Gottes mine, France.
7.512 (100), 3.266 (91), 3.528 (90), 2.975 (81), 2.688 (61), 3.767 (56), 8.323 (44)

Chemistry:

	(1)	(2)
As_2O_5	56.60	55.94
MnO	17.17	17.26
MgO	0.04	
CaO	12.98	13.65
H_2O	13.20	13.15
Total	99.99	100.00

(1) Gabe-Gottes mine, France; by AA, H_2O by the Penfield method; corresponds to $Ca_{0.95}Mn_{0.99}(AsO_3OH)_{2.02} \cdot 2H_2O$. (2) $CaMn(AsO_3OH)_2 \cdot 2H_2O$.

Occurrence: A post-mine low-temperature reaction product of carbonate gangue with arsenical solutions derived from arsenic (Gabe-Gottes mine, France).

Association: Arsenic, tennantite, skutterudite, sainfeldite, pharmacolite, villyaellenite, picropharmacolite, calcite, dolomite, ankerite, quartz (Gabe-Gottes mine, France).

Distribution: From the Gabe-Gottes mine, Rauenthal, near Sainte-Marie-aux-Mines, Haut Rhin, France. At Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA.

Name: In honor of Pierre Fluck, mineralogist, Louis Pasteur University, Strasbourg, France, who found the first specimen.

Type Material: Mineralogical Museum, Sainte-Marie-aux-Mines; National School of Mines, Paris, France; The Natural History Museum, London, England, 1979,341.

References: (1) Bari, H., F. Cesbron, F. Permingeat, and F. Pillard (1980) La fluckite, arséniate hydraté de calcium et manganèse $CaMnH_2(AsO_4)_2.2H_2O$, une nouvelle espèce minérale. Bull. Minéral., 103, 122–128 (in French with English abs.). (2) Catti, M., G. Chiari, and G. Ferraris (1980) Fluckite, $CaMn(HAsO_4)_2.2H_2O$, a structure related by pseudo-polytypism to krautite $MnHAsO_4.H_2O$. Bull. Minéral., 103, 129–134. (3) (1980) Amer. Mineral., 65, 1066 (abs. refs. 1–2).