Kayrobertsonite $MnAl_2(PO_4)_2(OH)_2 \cdot 6H_2O$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As intergrown masses of fibrous crystals to 100 μm, elongated along [001] and flattened on (100).

Physical Properties: *Cleavage*: None. *Fracture*: Splintery. *Tenacity*: Flexible. Hardness = ~ 2 D(meas.) = 2.29(3) D(calc.) = 2.41

Optical Properties: Translucent. *Color*: Snow-white. *Streak*: n.d. *Luster*: Silky. *Optical Class*: Biaxial (–). $\alpha = 1.530$ $\beta = 1.554$ $\gamma = 1.566$ 2V(meas.) = 70.3(5)° 2V(calc.) = 69.6° *Orientation*: $Z \approx c$.

Cell Data: *Space Group*: $P\bar{1}$. $a = 10.049(2)$ $b = 10.205(2)$ $c = 6.083(1)$ $\alpha = 91.79(3)°$ $\beta = 99.70(3)°$ $\gamma = 98.02(3)°$ Z = 2

X-ray Powder Pattern: Foote mine, Kings Mountain district, North Carolina, USA.
10.047 (100), 7.629 (44), 5.029 (12), 3.023 (12), 4.695 (10), 2.952 (10), 2.579 (10)

Chemistry:	(1)	(2)
CaO	0.41	0.74
MnO	16.11	15.20
FeO	0.27	0.30
Al_2O_3	22.43	22.17
P_2O_5	33.36	33.11
F	0.13	1.88
$-O = F_2$	0.05	0.79
H_2O	[29.30]	29.30
Total	101.96	101.91

(1) Foote mine, Kings Mountain district, North Carolina, USA; average of 8 electron microprobe analyses, H_2O calculated; corresponds to $Mn_{0.97}Ca_{0.03}Fe_{0.02}Al_{1.87}(PO_4)_2(OH)_{1.62}F_{0.03}(H_2O)_{0.38} \cdot 6H_2O$.
(2) Hagendorf Süd pegmatite, Hagendorf, Bavaria, Germany; average of 8 electron microprobe analyses, H_2O calculated; corresponds to $Mn_{0.92}Ca_{0.06}Fe_{0.02}Al_{1.87}(PO_4)_2(OH)_{1.19}F_{0.42}(H_2O)_{0.39} \cdot 6H_2O$.

Occurrence: A late-stage hydrothermal mineral in pegmatite as part of a complex suite of Al-rich secondary phosphates.

Association: Zwieselite-triplite, fluorapatite, nordgauite, whiteite-CaMnMn, members of the jahnsite group, morinite, fluellite, Al-bearing strunzite (Hagendorf); spodumene, mangangordonite, variscite, eosphorite, kastningite, paravauxite, beraunite, strengite, strunzite, cacoxenite (Foote mine).

Distribution: From the Hagendorf Süd pegmatite, Hagendorf, Oberpfalz, Bavaria, Germany and the Foote Lithium Company mine, Kings Mountain district, Cleveland County, North Carolina, USA.

Name: Honors German-American mineral collector Gabriella Kay Robertson (b. 1920) of Los Angeles, California, USA. Since the mid-1950s, Kay has been an ardent and sophisticated mineral collector, specializing in German minerals, and a valued resource for professional mineralogists.

Type Material: Museum Victoria, Melbourne, Australia (M53379, M53380, and M48795) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (65561 and 65562).

References: (1) Mills, S.J., I.E. Grey, A.R. Kampf, W.D. Birch, C.M. Macrae, J.B. Smith, and E. Keck (2016) Kayrobertsonite, $MnAl_2(PO_4)_2(OH)_2 \cdot 6H_2O$, a new phosphate mineral related to nordgauite. Eur. J. Mineral., 28(3), 649-654. (2) (2016) Amer. Mineral., 101, 2780-2781 (abs. ref. 1).