Gatumbaite $CaAl_2(PO_4)_2(OH)_2 \cdot H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$, 2, or m. Anhedral crystals, to 5 mm, bladed; in radial fibrous aggregates, in sheaves and rosettes.

Physical Properties: *Cleavage:* One, ‖ to the [010] fiber axis. *Fracture:* Asbestiform. *Tenacity:* Brittle. Hardness = < 5 D(meas.) = 2.92 D(calc.) = 2.95

Optical Properties: Translucent. *Color:* White. *Luster:* Pearly. *Optical Class:* Biaxial (–). *Orientation:* $Z = b$; OAP ⊥ {010}. $\alpha = 1.610(2)$ $\beta = [1.63]$ $\gamma = 1.639(2)$ 2V(meas.) = 65(5)° 2V(calc.) = 67°

Cell Data: *Space Group:* $P2/m$, $P2$, or Pm. a = 6.907(2) b = 5.095(2) c = 10.764(3) $\beta = 91°3(1)'$ Z = 2

X-ray Powder Pattern: Buranga pegmatite, Rwanda.
4.210 (100), 2.241 (100), 1.726 (75), 2.772 (70), 2.301 (65), 3.207 (50), 3.159 (50)

Chemistry:

	(1)	(2)	(3)
P_2O_5	41.35	41.95	42.24
TiO_2		0.13	
Al_2O_3	28.09	30.16	30.35
Fe_2O_3	2.20	0.04	
MnO	0.30		
CaO	17.35	16.22	16.69
Na_2O	0.30		
H_2O^+	10.68	[11.50]	10.72
H_2O^-	0.32		
Total	100.59	[100.00]	100.00

(1) Buranga pegmatite, Rwanda; $(OH)^{1-}$ and H_2O confirmed by IR, corresponds to $(Ca_{1.06}Na_{0.04}Mn^{2+}_{0.02})_{\Sigma=1.12}(Al_{1.89}Fe^{3+}_{0.10})_{\Sigma=1.99}(PO_4)_2(OH)_{2.14} \cdot 0.96H_2O$. (2) Mt. Perry, Australia; by electron microprobe, H_2O by difference; corresponds to $Ca_{0.98}Al_{2.00}(PO_4)_{2.00}(OH)_2 \cdot H_2O$. (3) $CaAl_2(PO_4)_2(OH)_2 \cdot H_2O$.

Occurrence: From the phosphate assemblage in a complex granite pegmatite (Buranga pegmatite, Rwanda; Hålsjöberg, Sweden.); in andesites altered hydrothermally through hydrogen metasomatism (Mt. Perry, Australia).

Association: Trolleite, scorzalite, apatite, bjarebyite, burangaite (Buranga pegmatite, Rwanda); trolleite, augelite, andalusite, rutile, topaz, quartz (Mt. Perry, Australia).

Distribution: In the Buranga pegmatite, near Gatumba, Rwanda. On Mt. Perry, 75 km southwest of Bundaberg, Queensland, Australia. At Hålsjöberg, Värmland, Sweden.

Name: For its occurrence near Gatumba, Rwanda.

Type Material: Royal Museum of Central Africa, Tervuren, Belgium, RMG10560; National Museum of Natural History, Washington, D.C., USA, 142982.

References: (1) von Knorring, O. and A.-M. Fransolet (1977) Gatumbaite, $CaAl_2(PO_4)_2(OH)_2 \cdot H_2O$: a new species from Buranga pegmatite, Rwanda. Neues Jahrb. Mineral., Monatsh., 12, 561–568. (2) (1978) Amer. Mineral., 63, 793–794 (abs. ref. 1). (3) Duggan, M.B., M.T. Jones, D.N.G. Richards, and J.L. Kamprad (1990) Phosphate minerals in altered andesite from Mount Perry, Queensland, Australia. Can. Mineral., 28, 125–131.