Gwihabaite $[(NH_4), K]NO_3$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As slender prismatic crystals, composed of {110}, {100}, and {111} and elongated along [001], to 5 mm; as divergent aggregates or "cave flowers".

Physical Properties: Hardness = ∼2 D(meas.) = 1.77 D(calc.) = 1.80 Soluble in H_2O, deliquescent.

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Orientation:* $X = b$; $Y = a$; $Z = c$. $\alpha = 1.458$ $\beta = 1.527$ $\gamma = 1.599$ 2V(meas.) = 90° 2V(calc.) = 87°

Cell Data: *Space Group: Pbnm.* $a = 7.075$ $b = 7.647$ $c = 5.779$ Z = 4

X-ray Powder Pattern: Gcwihaba Cave, Botswana.
3.194 (100), 3.212 (95), 2.595 (90), 3.364 (85), 3.863 (75), 2.400 (50), 3.805 (35)

Chemistry:

	(1)	(2)
N_2O_5	61.41	67.47
K_2O	10.40	
$(NH_4)_2O$	25.09	32.53
Total	96.90	100.00

(1) Gcwihaba Cave, Botswana; K by XRF, N and H by gas chromatography, original total reported as 98.90%; corresponds to $[(NH_4)_{0.81}K_{0.19}]_{\Sigma=1.00}(NO_3)_{1.00}$. (2) $(NH_4)NO_3$.

Occurrence: As crusts and efflorescences formed by bacterial action on bat guano in caves.

Association: Gypsum, syngenite, boussingaultite, dittmarite, weddellite, glushinskite, struvite, biphosphammite (Gcwihaba Cave, Botswana) struvite, biphosphammite (Wow Gdoom Pothole, Namibia); gypsum, wedellite, glushinskite, dittmarite (Temple of Doom Cave, South Africa).

Distribution: From Gcwihaba [!wihaba] Cave, 280 km west of Maun, northwestern Botswana. In the Temple of Doom Cave and Wow Gdoom Pothole, Namibia. At Hall's, Torch, and Chaos Caves, Transvaal, South Africa.

Name: For Gcwihaba Cave where the first specimens were collected, although the mineral name is spelled without the "c" (which stands for the "!" or "click" sound spoken by the San people who named the cave).

Type Material: Transvaal Museum, Pretoria, South Africa.

References: (1) Martini, J.E.J. (1996) Gwihabaite - $(NH_4, K)NO_3$, orthorhombic, a new mineral from Gcwihaba Cave, Botswana. Bull. South African Speleological Assoc., 36, 19–21. (2) (1999) Amer. Mineral., 84, 194 (abs. ref. 1). (3) Hill, C. and P. Forti (1997) Cave minerals of the world (2nd edition), National Speleological Soc., Huntsville, Alabama, 159.