Anthoinite $WAlO_3(OH)_3(?)$

Crystal Data: Triclinic. *Point Group:* n.d. As crystals, to only a few mm, platy on {010}; commonly in powdery or chalky masses, and pseudomorphs after large scheelite crystals.

Physical Properties: *Cleavage:* One direction, perfect. Hardness = 1 (massive). D(meas.) = 4.78–4.87 D(calc.) = 4.84

Optical Properties: Translucent. *Color:* White, when free of iron. *Luster:* Dull. *Optical Class:* Biaxial. n = 1.81–1.82; birefringence noted under high magnification. 2V(meas.) = n.d.

Cell Data: *Space Group:* n.d. $a = 9.21$ $b = 11.36$ $c = 8.26$ $\alpha = 94°45'$ $\beta = 90°$ $\gamma = 92°35'$ Z = [8]

X-ray Powder Pattern: Nyamulilo mine, Uganda; shows preferred orientation. 5.63 (100), 4.19 (83), 3.058 (71b), 3.97 (69), 2.462 (61), 4.33 (37), 4.12 (35)

Chemistry:

	(1)	(2)	(3)
WO_3	73.23	74.84	74.83
SiO_2	0.73	0.08	
Al_2O_3	16.41	16.03	16.45
Fe_2O_3	0.69	0.07	
CaO	0.25		
H_2O^+	8.70	9.06	8.72
H_2O^-		0.06	
Total	100.01	100.14	100.00

(1) Mt. Misobo mine, Congo; average of two analyses. (2) Bugarama mine, Rwanda; corresponds to $W_{1.00}Al_{0.97}O_{2.90}(OH)_{3.10}$. (3) $WAlO_3(OH)_3$.

Occurrence: In placers with cassiterite and wolframite and in quartz veins with ferberite, which appears to replace it (Mt. Misobo mine, Congo); in altered skarn (Kara mine, Tasmania).

Association: Ferberite, scheelite (Mt. Misobo mine, Congo); mpororoite, scheelite (Kara mine, Tasmania); raspite, ferberite, ferritungstite (Gifurwe mines, Rwanda): ferberite, scheelite, ferritungstite, russellite, mpororoite (Kalzas Mountain, Canada).

Distribution: From the Mt. Misobo tungsten mine, Kalima-Maniema district, and the Mierge mine, Kivu Province, Congo (Zaire). In the Bugarama and Gifurwe mines, Rwanda. In very large crystals from Bengo-Biri, Kalima, Congo Republic. In the Nyamulilo mine, Kigezi district, and the Bjordal mine, Kabole, Uganda. At the Kara mine, southwest of Burnie, Tasmania, Australia. From the Flo property, Kalzas Mountain, 67 km southeast of Mayo, Yukon Territory, Canada.

Name: For Raymond Anthoine (1884–?), Belgian mining engineer.

Type Material: Royal Museum of Central Africa, Tervuren, Belgium, RGM2426.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1097–1098. (2) Niggli, E. and E. Jäger (1957) Untersuchungen an Anthoinit. Neues Jahrb. Mineral., Abh., 91, 35–40 (in German). (3) Sahama, T.G., O. von Knorring, and M. Lehtinen (1970) New data for anthoinite. Bull. Geol. Soc. Finland, 42, 95–99. (4) Sahama, T.G. (1981) The secondary tungsten minerals, a review. Mineral. Record, 12, 81–87. (5) Matsubara, S., A. Kato, and K. Nagashima (1984) Mpororoite and anthoinite from the Kara mine, Tasmania. Mineral. Mag., 48, 397–400.