Zimbabweite $(Na,K)_2PbAs_4^{3+}(Ta,Nb,Ti)_4O_{18}$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals euhedral to subhedral, to 2 cm, with {010}, {201}, also {100}, {111}.

Physical Properties: *Cleavage:* {010}, perfect. *Tenacity:* Brittle. Hardness = 5–5.5 D(meas.) = 6.20(3) D(calc.) = 6.16

Optical Properties: Translucent. *Color:* Honey-yellow-brown; in transmitted light, pale yellow. *Streak:* White. *Luster:* Adamantine.
Optical Class: Biaxial (+). *Pleochroism:* Moderate; X = pale yellow-brown; Y = light reddish brown; Z = reddish brown. *Orientation:* $X = c$; $Y = b$; $Z = a$. *Dispersion:* $r < v$, very strong. $\alpha = > 2.10$ $\beta = > 2.10$ $\gamma = > 2.10$ 2V(meas.) = 80(4)°
R_1–R_2: (470) 17.6–17.8, (546) 17.0–17.1, (589) 16.6–16.7, (650) 16.2–16.5

Cell Data: *Space Group: Ccmb.* $a = 12.245(2)$ $b = 15.287(4)$ $c = 8.684(1)$ Z = 4

X-ray Powder Pattern: St. Ann's mine, Zimbabwe.
3.195 (100), 2.990 (70), 2.882 (70), 3.033 (60), 3.823 (55), 2.548 (50), 1.913 (50)

Chemistry:

	(1)		(1)
Nb_2O_5	4.8	SrO	0.02
Ta_2O_5	46.5	BaO	0.4
TiO_2	1.4	Na_2O	3.1
SnO_2	0.1	K_2O	1.5
UO_2	0.3	F	0.04
As_2O_3	26.5	H_2O^+	0.13
Bi_2O_3	0.2	H_2O^-	0.06
PbO	15.0	$-O = F_2$	0.02
		Total	100.03

(1) St. Ann's mine, Zimbabwe; by electron microprobe and a variety of other methods, total As as As_2O_3, H_2O by microcoulometry; corresponding to $(Na_{1.51}K_{0.48}Ba_{0.04})_{\Sigma=2.03}Pb_{1.01}(As_{4.03}Bi_{0.01})_{\Sigma=4.04}(Ta_{3.17}Nb_{0.55}Ti_{0.26}U_{0.02}Sn_{0.01})_{\Sigma=4.01}O_{18}$.

Occurrence: In a hydrothermally altered kaolinized zone of a complex rare-metal and fluorine-rich granite pegmatite.

Association: Kaolinite.

Distribution: From the St. Ann's mine, southeast of Miami, Karoi district, Zimbabwe.

Name: For Zimbabwe, the country where it was first found.

Type Material: National Museum of Natural History, Washington, D.C., USA, 162513.

References: (1) Foord, E.E., J.E. Taggart, Jr., R.V. Gaines, P.L.C. Grubb, and R. Kristiansen (1986) Zimbabweite, a new alkali-lead-arsenic tantalate from St Anns mine, Karoi District, Zimbabwe. Bull. Minéral., 109, 331–336. (2) (1990) Amer. Mineral., 75, 244 (abs. ref. 1). (3) Duesler, E.N., B.C. Chakoumakos, and E.E. Foord. (1988) Zimbabweite, $Na(Pb,Na,K)_2As_4(Ta,Nb,Ti)_4O_{18}$, an arsenite-tantalate with a novel corner-linked octahedral sheet. Amer. Mineral., 73, 1186–1190.