Gallobeudantite $PbGa_3(AsO_4,SO_4)_2(OH)_6$

Crystal Data: Hexagonal. *Point Group:* $3m$. Isolated crystals are rhombohedra, to nearly 1 mm, may be modified by {0001}, discoidal, strongly compositionally zoned; in subparallel aggregates.

Physical Properties: *Fracture:* Even to conchoidal. *Tenacity:* Brittle. Hardness = 4 D(meas.) = n.d. D(calc.) = 4.87 [AsO_4:SO_4 = 1:1].

Optical Properties: Transparent. *Color:* Pale yellow, pale green, cream-white. *Streak:* White to pale yellow. *Luster:* Vitreous.
Optical Class: Uniaxial (–). $\omega = 1.763(5)$ $\epsilon = 1.750(5)$

Cell Data: *Space Group: R3m.* $a = 7.225(4)$ $c = 17.03(2)$ $Z = 3$

X-ray Powder Pattern: Tsumeb, Namibia.
3.038 (100), 5.85 (90), 3.59 (40), 2.271 (40), 2.851 (30), 2.513 (30), 1.948 (30)

Chemistry:

	(1)	(2)
SO_3	9.5	10.63
P_2O_5	0.1	
As_2O_5	18.0	15.25
GeO_2	0.1	
Al_2O_3	4.5	
Fe_2O_3	8.9	
Ga_2O_3	19.3	37.32
ZnO	1.1	
PbO	31.0	29.63
CaO	0.0	
H_2O	[7.3]	7.17
Total	[99.8]	100.00

(1) Tsumeb, Namibia; by electron microprobe, average of six analyses, total Fe as Fe_2O_3, H_2O calculated from stoichiometry; corresponds to $Pb_{1.04}(Ga_{1.49}Fe^{3+}_{0.82}Al_{0.62}Zn_{0.10}Ge_{0.02})_{\Sigma=3.05}[(AsO_4)_{1.14}(SO_4)_{0.86}]_{\Sigma=2.00}(OH)_{5.94}$. (2) $PbGa_3(AsO_4,SO_4)_2(OH)_6$ with AsO_4:SO_4 = 1:1.

Mineral Group: Beudantite group.

Occurrence: A rare secondary mineral in vugs in oxidized ore from a dolostone-hosted hydrothermal polymetallic ore deposit.

Association: Stolzite, mercurian silver, otjisumeite, gallian beudantite, gallian hidalgoite, scorodite, hematite, goethite, reniérite, gallite, gallian tennantite, chalcocite.

Distribution: From Tsumeb, Namibia.

Name: For its predominant *gallium* content as a member of the *beudantite* group.

Type Material: Canadian Museum of Nature, Ottawa, 81518; Canadian Geological Survey, Ottawa, Canada.

References: (1) Jambor, J.L., D.R. Owens, J.D. Grice, and M.N. Feinglos (1996) Gallobeudantite, $PbGa_3[(AsO_4),(SO_4)]_2(OH)_6$, a new mineral species from Tsumeb, Namibia, and associated new gallium analogues of the alunite – jarosite family. Can. Mineral., 34, 1305–1315. (2) (1997) Amer. Mineral., 82, 1039 (abs. ref. 1).