

Segnitite

HPbFe₃³⁺(AsO₄)₂(OH)₆

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Crystal Data: Hexagonal. *Point Group:* $\bar{3} 2/m$ (probable). Rhombohedral or pseudo-octahedral crystals, to 5 mm, showing $\{11\bar{2}2\}$ and $\{0001\}$; typically as spherical clusters, or in drusy crusts and spongy aggregates.

Physical Properties: *Cleavage:* On $\{0001\}$, good. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~ 4 D(meas.) = > 4.2 D(calc.) = 4.77(1)

Optical Properties: Transparent to translucent. *Color:* Greenish brown to yellowish brown, dark brown. *Streak:* Pale yellow. *Luster:* Vitreous to adamantine.

Optical Class: Uniaxial (-). *Pleochroism:* Pale to medium yellow. $\omega = 1.975(5)$ $\epsilon = 1.955(5)$

Cell Data: *Space Group:* $[R\bar{3}m]$ (probable, by analogy to beudantite). $a = 7.359(3)$
 $c = 17.113(8)$ $Z = 3$

X-ray Powder Pattern: Broken Hill, Australia.

3.092 (100), 5.966 (50), 3.678 (40), 2.283 (30), 1.992 (30), 1.840 (25), 2.849 (20)

Chemistry:

	(1)	(2)
SO ₃	0.57	
P ₂ O ₅	0.37	
As ₂ O ₅	27.89	30.42
Al ₂ O ₃	1.13	
Fe ₂ O ₃	28.91	31.70
CuO	0.14	
ZnO	1.87	
PbO	30.58	29.54
BaO	0.49	
H ₂ O	8.01	8.34
Total	99.96	100.00

(1) Broken Hill, Australia; by electron microprobe, average of ten analyses, total Fe as Fe₂O₃, H₂O by CHN analyzer; corresponds to (Pb_{1.05}Ba_{0.03})_{Σ=1.08}(Fe_{2.76}Zn_{0.22}Al_{0.17}Cu_{0.01})_{Σ=3.16} [(AsO₄)_{1.85}(PO₄)_{0.05}(SO₄)_{0.04}]_{Σ=1.94}(OH, H₂O)_{6.24}. (2) HPbFe₃(AsO₄)₂(OH)₆.

Occurrence: Of rare occurrence in the oxidized zone of a Pb–Zn orebody (Broken Hill, Australia); in a dolostone-hosted hydrothermal polymetallic ore deposit (Tsumeb, Namibia).

Association: Beudantite–corkite, adamite–olivenite, duftite, bayldonite, carminite, mimetite, hidalgoite, pharmacosiderite, mawbyite, agardite-(Y), spessartine, quartz, coronadite, goethite (Broken Hill, Australia); olivenite, duftite (Tsumeb, Namibia).

Distribution: In Australia, from Broken Hill, New South Wales, and at Coppin Pool, about 41 km east-southeast of Mt. Tom Price, Western Australia. Large crystals from Tsumeb, Namibia. In the Centennial Eureka mine, Tintic district, Juab Co., Utah, USA. From the Penberthy Croft mine, St. Hilary, Cornwall, England.

Name: Honoring Dr. E. Ralph Segnit (1923–1999), mineralogist and petrologist, University of Adelaide, Adelaide, Australia, for his contributions to Australian mineralogy.

Type Material: Museum Victoria, Melbourne, Australia, M30044.

References: (1) Birch, W.D., A. Pring, and B.M. Gatehouse (1992) Segnitite, PbFe₃H (AsO₄)₂(OH)₆, a new mineral in the lusungite group from Broken Hill, New South Wales, Australia. *Amer. Mineral.*, 77, 656–659.

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