

**Crystal Data:** Hexagonal. *Point Group:* 32. As barrel-shaped or prismatic crystals to ~50  $\mu\text{m}$ .

**Physical Properties:** *Cleavage:* None. *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = ~3  
D(meas.) = n.d. D(calc.) = 6.73

**Optical Properties:** Transparent. *Color:* Light purple, bluish purple, grayish purple; can be color-zoned. *Streak:* White. *Luster:* Adamantine.  
*Optical Class:* Uniaxial (-).  $n(\text{calc.}) = 1.993$  *Pleochroism:* Weak,  $X = Y = \text{gray}$ ,  $Z = \text{purple}$ .  
*Absorption:*  $Z > X = Y$ . Straight extinction; length fast.

**Cell Data:** *Space Group:* P321.  $a = 8.4803(17)$   $c = 5.2334(12)$   $Z = 1$

**X-ray Powder Pattern:** Black Pine mine, Granite County, Montana, USA.  
3.298 (100), 3.008 (89), 1.905 (39), 2.456 (36), 1.609 (30), 4.244 (22), 2.783 (20)

Chemistry:	(1)	(2)
ZnO	15.98	18.57
PbO	50.72	50.95
FeO	0.97	
SiO <sub>2</sub>	0.70	
TeO <sub>3</sub>	5.78	
Sb <sub>2</sub> O <sub>5</sub>	7.68	12.31
P <sub>2</sub> O <sub>5</sub>	1.05	
As <sub>2</sub> O <sub>5</sub>	13.02	17.49
H <sub>2</sub> O	[0.44]	0.69
Total	96.34	100.00

(1) Black Pine mine, Granite County, Montana, USA; average electron microprobe analysis supplemented by Raman spectroscopy, H<sub>2</sub>O calculated; corresponding to  $\text{Pb}_{3.112}(\text{Zn}_{2.689}\text{Fe}^{2+}_{0.185})_{\Sigma=2.874}(\text{Sb}^{5+}_{0.650}\text{Te}^{6+}_{0.451})_{\Sigma=1.101}(\text{As}_{1.551}\text{P}_{0.203}\text{Si}_{0.160})_{\Sigma=1.914}\text{O}_{13.335}(\text{OH})_{0.665}$ .  
(2)  $\text{Pb}_3\text{Zn}_3\text{Sb}^{5+}\text{As}_2\text{O}_{13}(\text{OH})$ .

**Occurrence:** A secondary mineral from the oxidation of a silver-bearing tetrahedrite, hübnerite, and pyrite deposit.

**Association:** Mimetite, malachite, azurite, pseudomalachite, chalcocite, beudantite-corkite, duftite, dugganite, kuksite.

**Distribution:** From the Black Pine mine, 14.5 km northwest of Philipsburg, Granite County, Montana, USA.

**Name:** Honors *Joël Brugger* (b.1967), Swiss-Australian mineralogist, for his contributions to mineralogy.

**Type Material:** Department of Mineralogy, South Australian Museum, Adelaide, Australia (G32400) and the Mineral Sciences Division, Canadian Museum of Nature, Ottawa, Ontario, Canada (CMNMC 86061).

**References:** (1) Mills, S.J., U. Kolitsch, R. Miyawaki, L.A. Groat, and G. Poirier (2009) Joëlbruggerite,  $\text{Pb}_3\text{Zn}_3(\text{Sb}^{5+}, \text{Te}^{6+})\text{As}_2\text{O}_{13}(\text{OH}, \text{O})$ , the  $\text{Sb}^{5+}$  analog of dugganite, from the Black Pine mine, Montana. *Amer. Mineral.*, 94, 1012-1017.