

**Crystal Data:** Hexagonal. *Point Group:* 6/m. Prismatic crystals striated along [0001], granular, to 8 mm, or massive.

**Physical Properties:** *Cleavage:* Distinct on {1010}. *Tenacity:* Brittle. Hardness = ~ 4.5  
D(meas.) = 3.68(3) D(calc.) = 3.73 Fluoresces medium pinkish orange under SW UV; exhibits pale pink cathodoluminescence.

**Optical Properties:** Translucent. *Color:* Grayish white; colorless in thin section. *Streak:* White.  
*Luster:* Adamantine to greasy on fracture surfaces, vitreous on cleavage surfaces.  
*Optical Class:* Uniaxial (-).  $\omega = 1.687-1.716$   $\varepsilon = 1.684-1.698$

**Cell Data:** *Space Group:* P6<sub>3</sub>/m.  $a = 9.7242(2)$   $c = 6.9657(9)$   $Z = 2$

**X-ray Powder Pattern:** Franklin, New Jersey, USA.

2.895 (100), 2.820 (70), 2.798 (70), 3.98 (50), 3.47 (50), 2.683 (45), 1.879 (45)

Chemistry:	(1)	(2)	(3)
P <sub>2</sub> O <sub>5</sub>	1.7	0.46	
As <sub>2</sub> O <sub>5</sub>	52.2	51.71	54.28
SiO <sub>2</sub>		0.18	
FeO	0.2		
MgO	0.1		
CaO	43.5	43.49	44.14
PbO		1.13	
F	0.2		1.50
Cl	0.1	0.18	
H <sub>2</sub> O	1.3	[1.35]	0.71
-O = (F,Cl) <sub>2</sub>	0.1	0.04	0.63
Total	99.2	98.46	100.00

(1) Franklin, New Jersey, USA; by electron microprobe, H<sub>2</sub>O by DTA-TGA; corresponding to (Ca<sub>4.86</sub>Fe<sub>0.02</sub>Mg<sub>0.02</sub>) $\Sigma=4.90$ [(As<sub>0.95</sub>P<sub>0.05</sub>) $\Sigma=1.00$ O<sub>3.99</sub>]<sub>3</sub>[(OH)<sub>0.90</sub>F<sub>0.06</sub>Cl<sub>0.02</sub>] $\Sigma=0.98$ . (2) Harstigen mine, Långban, Sweden; average of 5 electron microprobe analyses, H<sub>2</sub>O calculated as 1 (OH+Cl) pfu; corresponds to (Ca<sub>5.02</sub>Pb<sub>0.03</sub>) $\Sigma=5.05$ (As<sub>2.91</sub>P<sub>0.04</sub>Si<sub>0.02</sub>) $\Sigma=2.97$ O<sub>12</sub>(OH<sub>0.97</sub>Cl<sub>0.03</sub>). (3) Ca<sub>5</sub>(AsO<sub>4</sub>)<sub>3</sub>(OH,F) with OH:F = 1:1.

**Mineral Group:** Apatite group.

**Occurrence:** A very rare mineral, part of a metamorphic skarn assemblage in a metamorphosed stratiform zinc orebody (Franklin, New Jersey, USA).

**Association:** Yeatmanite, diopside, andradite, franklinite, copper, roméite (Franklin, New Jersey, USA); tilasite, andradite, calcite, caryopilite (Långban, Sweden).

**Distribution:** From Franklin and Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA. In Russia, at the Novofrolovskoye copper deposit, Turinsk district, near Krasnoturinsk, Northern Ural Mountains and Yuliya Svintsovaya Pb-Zn deposit, 20 km east-northeast of Son railway station, western Siberia. At the Harstigen mine, Långban, Värmland, Sweden. At the Fuka mine, Okayama Prefecture, Japan.

**Name:** Honors John L. Baum (1916-2011), Hamburg, New Jersey, USA, former Curator of the Franklin Mineral Museum and collector of the first specimen containing the mineral.

**Type Material:** Royal Ontario Museum, Toronto, Canada; the Natural History Museum, London, England; Harvard University, Cambridge, Massachusetts (116461) and the National Museum of Natural History, Washington, D.C., USA (144444).

**References:** (1) Dunn, P.J., D.R. Peacor, and N. Newberry (1980) Johnbaumite, a new member of the apatite group from Franklin, New Jersey. *Amer. Mineral.*, 65, 1143-1145. (2) Malinko, S.V., *Mineralogical Society of America Handbook of Mineralogy* Revised 8/7/2017

G.S. Rumyantsev, and G.A. Sidorenko (1966) Svabite [= johnbaumite] from contact-metamorphic deposits of Siberia and the Urals. Doklady Acad. Nauk SSSR, 166, 1195-1198 (in Russian).  
(3) Biagioni, C. and M. Pasero (2013) The crystal structure of johnbaumite,  $\text{Ca}_5(\text{AsO}_4)_3\text{OH}$ , the arsenate analogue of hydroxylapatite. Amer. Mineral., 98, 1580-1584. (4) Kusachi, I., C. Henmi, and S. Kobayashi (1996) Johnbaumite from Fuka, Okayama Prefecture, Japan. Mineral. J., 18(2), 60-66.