Johnbaumite

\[
\text{Ca}_5(\text{AsO}_4)_3(\text{OH,F})
\]

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

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


Cell Data: \textit{Space Group:} P6\(_3\)/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:

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\begin{array}{ccc}
\text{P}_2\text{O}_5 & 1.7 & 0.46 \\
\text{As}_2\text{O}_5 & 52.2 & 51.71 & 54.28 \\
\text{SiO}_2 & & 0.18 \\
\text{FeO} & 0.2 & & \\
\text{MgO} & 0.1 & & \\
\text{CaO} & 43.5 & 43.49 & 44.14 \\
\text{PbO} & 1.13 & & \\
\text{F} & 0.2 & & 1.50 \\
\text{Cl} & 0.1 & 0.18 & \\
\text{H}_2\text{O} & 1.3 & [1.35] & 0.71 \\
\text{O} = (\text{F,Cl})_2 & 0.1 & 0.04 & 0.63 \\
\hline \\
\text{Total} & 99.2 & 98.46 & 100.00 \\
\end{array}
\]

(1) Franklin, New Jersey, USA; by electron microprobe, \(\text{H}_2\text{O}\) by DTA-TGA; corresponding to \((\text{Ca}_{4.86}\text{Fe}_{0.02}\text{Mg}_{0.02})_2\text{As}_{0.95}\text{P}_{0.05}\text{O}_3.99\text{F}_{0.00}\text{Cl}_{0.02})_2\text{OH}_{0.90}\text{F}_{0.00}\text{Cl}_{0.02}\).

(2) Harstigen mine, Långban, Sweden; average of 5 electron microprobe analyses, \(\text{H}_2\text{O}\) calculated as 1 (OH+Cl) pfu; corresponds to \((\text{Ca}_{5.02}\text{Pb}_{0.03})_2\text{As}_{2.91}\text{P}_{0.04}\text{Si}_{0.02}\text{O}_3.97\text{F}_{0.00}\text{Cl}_{0.02}\).

(3) \(\text{Ca}_5(\text{AsO}_4)_3(\text{OH,F})\) with \(\text{OH:F} = 1:1\).

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).


(3) Biagioni, C. and M. Pasero (2013) The crystal structure of johnbaumite, Ca₅(AsO₄)₃OH, the arsenate analogue of hydroxylapatite. Amer. Mineral., 98, 1580-1584.