Allabogdanite \((\text{Fe}, \text{Ni})_2\text{P}\)

Crystal Data: Orthorhombic. Point Group: \(2/m 2/m 2/m\). As lamellar crystals to 0.4 mm, flattened on (001) with dominant \{001\} and probable \{110\} and \{100\}; pseudo-monoclinic habit. As rounded nodules to 0.5 mm. Twinning: Common, with possible composition plane \{110\}.


Optical Class: n.d. Anisotropism: Distinct, light to dark cream. R\(_{1}\)–R\(_{2}\): (440) 48.7-37.2, (460) 46.7-36.8, (480) 47.0-37.6, (500) 47.5-38.1, (520) 47.6-38.8, (540) 48.2-39.2, (560) 49.0-39.9, (580) 49.6-40.7, (600) 50.1-41.6, (620) 50.5-41.9, (640) 51.9-43.0, (660) 52.3-44.3, (680) 53.3-45.0, (700) 54.4-46.2

Cell Data: Space Group: \(Pnma\). \(a = 5.792(7)\) \(b = 3.564(4)\) \(c = 6.691(8)\) \(Z = 4\)

X-ray Powder Pattern: Onello iron meteorite.

2.238 (100), 2.120 (80), 2.073 (70), 1.884 (50), 1.843 (40), 1.788 (40), 1.774 (40)

Chemistry:

\[
\begin{array}{lll}
\text{Fe} & 57.7 & 76.24 \\
\text{Ni} & 20.7 & 1.64 \\
\text{Co} & 1.4 & 0.19 \\
\text{Mo} & 0.33 & \\
\text{P} & 20.4 & 21.58 \\
\end{array}
\]

Total 100.2 100.00

Onello iron meteorite; average of nine electron microprobe analyses; corresponds to \((\text{Fe}_{1.51}\text{Ni}_{0.50}\text{Co}_{0.03})\text{P}_{0.96}\). Halamish Wadi, H atrurim Basin, Israel; electron microprobe analysis; corresponds to \((\text{Fe}_{1.95}\text{Ni}_{0.04}\text{Co}_{0.06}\text{Mo}_{0.06})\text{P}_{2.00}\).

Polymorphism & Series: High pressure polymorph of barringerite.

Occurrence: A primary phase in nickel-rich ataxite meteorites. In surficial terrestrial pyrometamorphic rocks, possibly formed by transformation from barringerite.

Association: Nickelphosphide, schreibersite, awaruite, graphite; barringerite, diopside (Israel).

Distribution: From from the Onello iron meteorite (Ni-rich ataxite) [TL] and the Barbianello and Santa Catharina meteorites. In the Halamish Wadi (Nahal Halamish), H atrurim Basin, Israel.

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Type Material: Mineralogical Museum, Department of Mineralogy, St. Peters burg State University, Russia (1/18632).