Swaknoite  
\((\text{NH}_4)_2\text{Ca(PO}_3\text{OH)}_2\cdot\text{H}_2\text{O}\)

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Crystal Data:  Orthorhombic.  Point Group:  n.d.  Crystals are needlelike, elongate along [001], with \{110\}, \{100\}, \{111\}, \{001\}, to 1 mm, in rosettes; as coatings.

Physical Properties:  Tenacity: Brittle.  Hardness = Soft.  \(D(\text{meas.}) = 1.91\)  
\(D(\text{calc.}) = 1.89\)  Soluble on \(\text{H}_2\text{O}\).

Optical Properties:  Semitransparent.  Color: White.  Luster: Vitreous.  Optical Class: Biaxial (−).  Orientation:  \(X = b; Y = a; Z = c\).  \(\alpha = 1.506\)  \(\beta = 1.510\)  \(\gamma = 1.512\)  \(2V(\text{meas.}) = 65(10)^\circ\)  \(2V(\text{calc.}) = 70^\circ\)

Cell Data:  Space Group:  n.d.  \(a = 20.959\)  \(b = 7.403\)  \(c = 6.478\)  \(Z = 4\)

X-ray Powder Pattern:  Arnhem Cave, Namibia.  
6.99 (100), 3.705 (89), 10.5 (57), 3.177 (55), 3.651 (39), 4.739 (36), 5.24 (21)

Chemistry:  
\[
\begin{array}{cc}
\text{P}_2\text{O}_5 & 48.93 \quad 49.61 \\
\text{CaO} & 21.46 \quad 19.60 \\
(\text{NH}_4)_2\text{O} & 16.06 \quad 18.20 \\
\text{H}_2\text{O} & 12.78 \quad 12.59 \\
\hline
\text{Total} & 99.23 \quad 100.00
\end{array}
\]

(1) Arnhem Cave, Namibia; by electron microprobe, \(\text{NH}_4\) and \(\text{H}_2\text{O}\) by CHN analyzer; corresponds to \((\text{NH}_4)_{1.78}\text{Ca}_{1.10}(\text{PO}_3\text{OH})_{1.99}\cdot1.05\text{H}_2\text{O}\).  (2) \((\text{NH}_4)_2\text{Ca(PO}_3\text{OH)}_2\cdot\text{H}_2\text{O}\).

Polymorphism & Series:  Dimorphous with mundrabillaite.

Occurrence:  Formed from bat guano and urine by reaction with cave walls.

Association:  Mundrabillaite, dittmarite, arcanite, dolomite.

Distribution:  Found in Arnhem Cave, 150 km east of Windhoek, Namibia.

Name:  From Suid Wes Africa Karst Navorsing Organisasie (SWAKNO), a speleological exploration organization, the members of which noted the species.

Type Material:  State Museum, Windhoek, Namibia; Transvaal Museum, Pretoria, South Africa.