Vochtenite \((\text{Fe}^{2+}, \text{Mg})\text{Fe}^{3+}(\text{UO}_2)_4(\text{PO}_4)_4(\text{OH})\cdot 12-13\text{H}_2\text{O}\)

Crystal Data: Monoclinic. Point Group: n.d. As crystals, with a squarish outline defined by \{001\} and \{100\}, to 1 mm, in subparallel aggregates.


\(\alpha = 1.575(2)\) \(\beta = 1.589(2)\) \(\gamma = 1.603(2)\) 2V(meas.) = n.d. 2V(calc.) = 89(3)°

Cell Data: Space Group: n.d. \(a = 12.606\) \(b = 19.990\) \(c = 9.990\) \(\beta = 102.31°\) \(Z = 3\)

9.998 (100), 3.475 (70), 3.333 (50), 4.892 (45), 2.152 (45), 2.111 (45), 3.087 (40)

Chemistry:

\begin{align*}
\text{UO}_3 & \quad 63.07 \\
\text{P}_2\text{O}_5 & \quad 15.65 \\
\text{Fe}_2\text{O}_3 & \quad 4.04 \\
\text{FeO} & \quad 3.30 \\
\text{MgO} & \quad 0.63 \\
\text{H}_2\text{O} & \quad 13.37 \\
\text{Total} & \quad [100.06]
\end{align*}

(1) Wheal Basset, England; by electron microprobe, at ten points on each of three crystals; Fe\(^{2+}\):Fe\(^{3+}\) by Mössbauer spectroscopy, H\(_2\)O by TGA, original total given as 100.96%; corresponds to \((\text{Fe}^{2+}_{0.82}\text{Mg}_{0.28})\Sigma=1.10\text{Fe}^{3+}_{0.90}(\text{UO}_2)_4(\text{PO}_4)_4(\text{OH})_{0.90}\cdot 12.96\text{H}_2\text{O}\).

Occurrence: A rare secondary mineral in the oxidized zone of a uranium-bearing Cu–Sn hydrothermal mineral deposit.

Association: Bassetite.


Name: Honoring Professor Renaud F.C. Vochten (1933– ), State University, Antwerp, Belgium, uranium mineralogist, who discovered the mineral.

Type Material: National Museum of Natural History, Washington, D.C., USA.