Widenmannite $Pb_2(UO_2)(CO_3)_3$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$, $mm2$, or 222. Lathlike crystals, tabular on {010}, elongated along [001], to 100 μm, showing {100}, {010}, {001}, {101}; aggregated in tufts and mats.

Physical Properties: *Cleavage:* Perfect on {010}. Hardness = ∼2 D(meas.) = n.d. D(calc.) = 6.89 Radioactive.

Optical Properties: Transparent to translucent. *Color:* Colorless, very pale greenish yellow, yellow. *Streak:* Pale yellow. *Luster:* Pearly to silky.
Optical Class: Biaxial (–). *Orientation:* $X = b$; $Y = a$; $Z = c$. $\alpha = 1.803(5)$ $\beta = 1.905(5)$ $\gamma = 1.945(5)$ 2V(meas.) = 63°

Cell Data: *Space Group:* $Pnmm$, $Pnm2_1$, or $P22_12_1$. $a = 8.971$–8.99 $b = 9.36$–9.381 $c = 4.95$–5.002 Z = 2

X-ray Powder Pattern: Michael mine, Germany.
4.16 (10), 2.34 (10), 3.19 (8b), 3.34 (7), 1.911 (5), 1.869 (5), 1.473 (5b)

Chemistry:

	(1)	(2)	(3)
CO_2	16.5	16.1	15.27
UO_3	34.2	31.8	33.09
PbO	48.3	51.7	51.64
Total	99.0	99.6	100.00

(1) Michael mine, Germany; by electron microprobe. (2) Loe Warren zawn, England; by electron microprobe, here recalculated to oxides. (3) $Pb_2(UO_2)(CO_3)_3$.

Occurrence: A rare secondary mineral in the oxidized zone of a hydrothermal As–Pb-bearing deposit (Michael mine, Germany); an alteration product of sulfides by sea water (Loe Warren zawn, England).

Association: Hügelite, hallimondite, cerussite, galena, quartz (Michael mine, Germany); dewindtite, uraninite (Loe Warren zawn, England).

Distribution: From the Michael mine, Weiler, near Lahr, Black Forest, Germany. At Jáchymov (Joachimsthal), Czech Republic. From Loe Warren zawn, 0.75 km west of Botallack, St. Just, Cornwall, England.

Name: To honor Johann Friedrich Wilhelm Widenmann (1764–1798), German mineralogist who discovered uranium in the Black Forest.

Type Material: [University of Strassburg, Strassburg, France.]

References: (1) Walenta, K. and W. Wimmenauer (1961) Die Mineralbestand des Michaelganges in Weiler bei Lahr (Schwarzwald). Jahreshefte geol. Landesamtes Baden-Württemberg, 4, 7–37 (in German). (2) (1962) Amer. Mineral., 47, 415 (abs. ref. 1). (3) Walenta, K. (1976) Widenmannit und Joliotit, zwei neue Uranylkarbonatmineralien aus dem Schwarzwald. Schweiz. Mineral. Petrog. Mitt., 56, 167–185 (in German with English abs.). (4) Elton, J.J. and J.J. Hooper (1995) Widenmannite from Cornwall, England: the second world occurrence. Mineral. Mag., 59, 745–749.