Schumacherite $Bi_3O(VO_4, AsO_4, PO_4)_2(OH)$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Crystals are tabular ∥ {010}, with $\{\overline{1}10\}$, and $\{10\overline{1}\}$, to 0.1 mm, in crusts.

Physical Properties: *Fracture:* Conchoidal. Hardness = ∼3 D(meas.) = n.d. D(calc.) = 6.90

Optical Properties: Translucent. *Color:* Yellow, yellow-brown, red-brown. *Luster:* Adamantine. *Optical Class:* Biaxial (+), probable. *Orientation:* $X' \wedge c \simeq 22°$; OAP $\simeq \{11\overline{1}\}$. $\alpha = > 2.20(2)$ β = n.d. $\gamma = 2.42(2)$ 2V(meas.) = ∼90°

Cell Data: *Space Group:* $P\overline{1}$. $a = 10.05(3)$ $b = 7.46(3)$ $c = 6.90(3)$ $\alpha = 87.7(3)°$ $\beta = 115.3(3)°$ $\gamma = 111.5(3)°$ Z = 2

X-ray Powder Pattern: Schneeberg, Germany; very similar to preisingerite and petitjeanite. 3.28 (10), 3.19 (8), 3.09 (8), 4.57 (6), 1.976 (5), 6.21 (4), 4.13 (4)

Chemistry:

	(1)
P_2O_5	3.6
As_2O_5	5.8
V_2O_5	10.9
Bi_2O_3	79.0
H_2O	[1.0]
Total	[100.3]

(1) Schneeberg, Germany; by electron microprobe, H_2O calculated; corresponds to $Bi_{3.03}O_{0.97}[(V_{0.54}As_{0.22}P_{0.22})_{\Sigma=0.98}O_4]_2(OH)_{1.00}$.

Polymorphism & Series: Forms series with petitjeanite and preisingerite.

Occurrence: Very rare, in the oxidized zone of Bi-rich hydrothermal deposits.

Association: Pucherite, namibite, quartz (Schneeberg, Germany); bismutite, bismutoferrite, bismutostibiconite, koechlinite, namibite (Lodi #4 mine, California, USA); beyerite, namibite (Mica Lode mine, Colorado, USA); mrázekite, pucherite (Morass Creek, Australia).

Distribution: From the Pucher shaft, Wolfgang Maassen mine, and on the Sauschwart mine dump, Schneeberg, Saxony, Germany. In the USA, at the Lodi #4 mine, Spring Creek district, Plumas Co., California; from the Mica Lode mine, Eight Mile Park, Fremont Co., Colorado; from Manhattan, Nye Co., Nevada. At Morass Creek, north of Benambra, Victoria, Australia.

Name: To honor Professor Friedrich Schumacher (1884–1975), Universities of Freiberg and Bonn, Germany.

Type Material: University of Stuttgart, Stuttgart, Germany; National Museum of Natural History, Washington, D.C., USA, 149596.

References: (1) Walenta, K., P.J. Dunn, G. Hentschel, and K. Mereiter (1983) Schumacherit, ein neues Wismutmineral von Schneeberg in Sachsen. Tschermaks Mineral. Petrog. Mitt., 31, 165–173 (in German with English abs.). (2) (1985) Amer. Mineral., 70, 438 (abs. ref. 1). (3) Krause, W., K. Belendorff, and H.-J. Bernhardt (1993) Petitjeanite, $Bi_3O(OH)(PO_4)_2$, a new mineral, and additional data for the corresponding arsenate and vanadate, preisingerite and schumacherite. Neues Jahrb. Mineral., Monatsh., 487–503.